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SYPHILITIC AORTITIS*

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The predilection of syphilis for the arterial system, especially the thoracic aorta, is a well established fact, and has been the subject of much interest and endeavor. The advent of modern methods of diagnosis; such as roentgenography and the Wassermann test, have certainly contributed to a greater degree of accuracy in diagnosis, yet they have not fully solved the problem of identifying syphilitic disease of the aorta. The general tendency in modern medicine, unfortunately, has been to place too much emphasis on laboratory methods in the diagnosis of disease. It is not our intention to depreciate the value of the newer methods; we wish rather to emphasize the importance of recognizing them as valuable adjuncts, and to invite attention and interest again to the old, well established methods of physical diagnosis. No one method of diagnosis is infallible, and accuracy, therefore, depends on the intelligent interpretation and evaluation of all methods.

The syphilitic lesion is commonly on the ascending aorta, then on the arch and descending aorta. Klotz's excellent experimental studies and observations have explained many of the problems dealing with syphilitic disease of the aorta. He has shown that the lymphatic supply of the aorta is not uniform, in certain regions the lymphatics are present in great numbers, while in other regions the distribution is meager. The ascending aorta appears to have lymphatics in common with the pericardium, and also communications with a group of nodes that join the lymphatics of the anterior medias-

tinum. Around the arch of the aorta are found lymphatics supplying the aortic wall. These connect with nodes in the anterior mediastinum, with those around the right and left border of the trachea, and with those at its bifurcation. The descending aorta has a variable number of lymph nodes, particularly along its right border, which form a plexus around the exit of the intercostal arteries. This lymphatic system is in direct communication with the two large drainage beds of the body, the one in the thorax and the one in the abdomen. These observations certainly clarify the problems of regional localization of syphilitic lesions on the aorta.

Klotz has shown further that the *Spirocheta pallida* attacks the aorta by way of the small lymphatics accompanying the vasa vasorum. The infection enters from without, and occurs first in the adventitia, with resulting periaortitis. This accounts for the common observation of cohesion of the aorta with the surrounding structures. The early involvement of the adventitia has significant bearing on certain of our succeeding remarks and observations. The periaortitis is then progressively followed by involvement of the media (mesoaortitis) and of the intima (endoaortitis). The pathologic changes of syphilitic aortitis are so well known that a detailed description here is unnecessary, except for the statement that the inflammation is productive in character, with a tendency to reparative fibrosis and resulting deformity. The cicatricial fibrosis has a definite bearing on the progression of the symptoms and on the objective findings of the disease; this will be emphasized later.

One hundred forty patients with syphilitic disease of the aorta were observed by us for a period of from one to eight years. The patients have been studied in three groups, according to the degree of apparent damage which fairly accurately divides the course of the disease into clinical periods: (1) early stage, (2) moderately advanced stage, and (3) advanced stage.

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Early Stage.—The early stage of syphilitic aortitis comprises cases in which the characteristic objective findings of aortic disease is lacking, namely, the absence of appreciable cardiac enlargement, murmurs, vascular phenomena of aortic regurgitation, and dilatation of the aorta. Ten of our patients, seven males and three females, were classified in this group. One patient was in the third decade of life, two in the fourth, four in the fifth, and three in the sixth. The marked dominance of males was noted also in the other groups, and supports Stokes' opinion of a relatively increased immunity in women against syphilitic infection. The age of the patient is an important factor, as undoubtedly many years elapse before the disease is evidenced by symptoms. In this group the average time from the occurrence of the primary lesion to the initial examination, was seventeen years. Three of the patients when first examined had no symptoms referable to the cardiovascular system, five had mild dyspnea and palpitation with exertion, and two had typical anginal attacks.

Quite early in our experience with cardiovascular syphilis, we noted that occasionally a patient was encountered in whom the characteristic objective findings enumerated were absent, but in whom a peculiar tambour-like accentuation of the aortic second tone was audible. This peculiar tympanic accentuation was usually quite well localized to the aortic area, but at times was heard also to the left of the upper sternum. Our first impression was the anticipation of finding hypertension, but sphygmographic studies failed to confirm this supposition. The first patient in whom this peculiar change in the character of the aortic second tone was noted, was repeatedly under our observation during the time she was receiving rigid treatment for syphilis. At the end of nine months a rough, reverberant systolic murmur was audible at the aortic area, and transmitted into the carotids. At the end of two years this patient had the classical signs of aortic regurgitation besides the systolic murmur, and the tambour-like accentuation of the aortic second tone was lost. We have observed this same progression of events in five other cases.

The peculiar character of the second tone was described years ago by Potain, and again emphasized by McRae and by Longcope, but the phenomenon has apparently attracted little attention recent-

ly. The probable mechanics of this distinctive aortic second tone is interesting and logical, in view of Klotz's work. If the fact is recalled that the primary involvement of the aorta occurs in the adventitia and media, one can readily appreciate that these changes will cause alterations in the elasticity or resilience of the aorta, not only through fibrotic changes in the adventitia, but by cohesion of the aorta to contiguous structures. This diminution in the elasticity of the aortic wall in the presence of a competent aortic valve necessarily increases the resistance against the inrush of blood from the heart, which in turn increases the intra-aortic tension and causes rather forcible closure of the semilunar leaflets. This finding cannot, of course, be interpreted as indicative of the presence of periaortitis alone, since undoubtedly the other layers of the aorta may sometimes be involved. We believe that this peculiar tympanic accentuation of the aortic second tone, in conjunction with other evidence of syphilis, justifies the diagnosis of early syphilitic aortitis. It is so different from the changes accompanying hypertension and atherosclerosis of the aorta that these should not be confused with it. In the latter conditions the second tone is usually accentuated but has a metallic character, or else its quality is not altered, but simply intensified.

In two only of the ten patients did the roentgenograms reveal dilatation of the aorta, and in both instances the dilatation was slight. We have repeatedly been disappointed in the failure of roentgenography to aid us in the early diagnosis of disease of the aorta.

The blood Wassermann reactions were strongly positive in nine patients and negative in one. Three patients had associated syphilitic lesions; one had syphilis of the central nervous system with positive serologic changes in the spinal fluid; one had osseous syphilis, and the patient having the negative blood Wassermann reaction had typical cutaneous syphilis, which was cured completely under treatment. Electrocardiography is of little diagnostic value in these incipient cases; in only one of the entire group were there significant alterations in the graphs, consisting of negativity of the T wave in Derivation I. This patient had angina pectoris.

Five of the ten patients were traced. The condition of three is worse, of one unchanged, and of one improved; none is dead.

Moderately Advanced Stage.—The patients who have been classified for study in the moderately advanced stage of syphilitic aortitis, are those whose examination revealed systolic murmur, usually quite well localized to the aortic area, invariably rough and reverberant in character, and frequently transmitted into the carotids. In about half of the cases the aortic second tone was accentuated, but did not have the peculiar tambour-like quality we have described. There were thirty patients in this group, nineteen males and eleven females. One patient, with typical hereditary syphilis, was in the first decade of life, one was in the second decade, one in the third, seven were in the fourth, eleven in the fifth, twelve in the sixth, and two in the seventh. An average of twenty-one and one-half years elapsed between the primary lesion and our examination.

Six of the thirty patients had no complaints referable to the cardiovascular system, thirteen had varying degrees of dyspnea, palpitation, and other symptoms indicative of an inefficient heart, and eleven had angina pectoris; this latter group will be considered more in detail later. The systolic murmur, with its peculiar reverberant quality, is probably due to the intimal roughening indicative of moderately advanced aortic syphilis. In three cases only did the roentgenograms reveal even slight to moderate dilatation of the aorta, while in many cardiac enlargement was noted.

The blood Wassermann reactions were strongly positive in fifteen patients, negative in twelve, and not recorded in three. The spinal fluids of six patients were serologically positive, and of these, three had negative blood Wassermann reactions; the reaction was not recorded in one. Thus eighteen patients in the group had serologic signs indicative of syphilis. Twelve patients had syphilis besides the cardiovascular involvement; eight of these had syphilis of the central nervous system, two of the osseous system, one of the skin, and one of the liver.

The electrocardiograms of only three patients revealed significant abnormalities. These consisted of T wave negativity, in one case involving Derivation I, and twice affecting combined Derivations I and II. Two of the patients had angina pectoris and the other, severe attacks of paroxysmal dyspnea, conforming to the old entity formerly termed angina pectoris sine dolore.

Eighteen of the thirty patients were traced. Four

report their condition to be worse, six unchanged, and two improved. Two patients died of heart disease, an average of fifteen months after our initial examination. Four patients died of other causes.

Advanced Stage.—Patients whose syphilitic aortitis had progressed to the development of aortic regurgitation were classified as being in the advanced stage. It is needless here to review the classical signs of this lesion. Aneurysm of the aorta, of course, is a manifestation of advanced aortic syphilis, but has not been included in this study since it warrants more consideration than the scope of this presentation will permit. There were 100 patients in this group, of which eighty-eight were males and twelve were females. Three patients were in the third decade, eighteen in the fourth, forty-seven in the fifth, twenty-seven in the sixth, and five in the seventh. An average of twenty years had elapsed from the time the primary lesion appeared until our initial examination.

No one of the patients was free from cardiovascular symptoms, sixty-three had dyspnea, palpitation, and so forth, and thirty-seven had angina pectoris. It is well known that the syphilitic process in the aorta is retrogressive as well as progressive, and that involvement of the aortic valve is almost inevitable in an advancing process. Aortic regurgitation occurs either from cicatricial deformity of the aortic ring, or valve leaflets, or from dilatation of the ring from the associated involvement of the aorta itself. The loss of the accentuation of the aortic second tone or its utter disappearance in the presence of aortic regurgitation, is due, of course, to the failure of the valves to approximate. Occasionally the second tone is accentuated, and such accentuation is the result probably of sclerotic changes of the valves favoring sound production. The roentgenograms revealed aortic dilatation in eighteen patients, in six of whom it was aneurysmal.

The blood Wassermann reactions were strongly positive in seventy-two patients, negative in twenty-five, and not recorded in three. The spinal fluid of fifty-five patients was studied; syphilis was indicated serologically in eighteen, the studies were negative in thirty-seven. Two patients with negative blood Wassermann reactions had positive reactions on the spinal fluid, thus the total serology in this group was positive in seventy-four instances. Twenty-four patients had associated syphilitic lesions, and of these twenty-three had syphilis of

the central nervous system, and one a tertiary lesion of the mucous membrane.

The electrocardiograms of thirty-four patients revealed significant changes, chiefly significant T wave negativities as follows: eight patients had T wave negativity in Derivation I, seven T wave negativity in combined Derivations I and II, nine had T wave negativity in combined Derivations II and III, and in eight patients all the derivations were affected. One patient, besides having the T wave negativity in Derivation I, had QRS complexes aberrant in all derivations. One patient had auricular fibrillation. One of us⁸ previously emphasized the infrequency of auricular fibrillation in aortic disease, in a study of 500 patients with auricular fibrillation disclosing only thirteen aortic lesions. Eighteen of the thirty-four patients with significant T wave negativity had angina pectoris.

Sixty-four of the 100 patients were traced. Thirteen were worse, thirteen unchanged, and six improved. Thirty-one had died of heart disease an average of fourteen months from the time of examination. One patient had died, but the cause could not be ascertained.

PAIN WITH SYPHILITIC AORTITIS

A discussion of the character of the anginal attacks attending syphilitic aortitis is warranted here, since the origin of pain and its distribution are often bizarre. Fifty of the 140 patients in this series had had anginal attacks. Six patients had typical attacks, consisting of severe retrosternal pain, radiating into the left arm, and precipitated by exertion. Twenty-five patients had attacks of severe retrosternal pain without radiation following exertion. Two patients had retrosternal pain, radiating through to the back, to the right side of the neck, and into the right arm; and one patient had pain in both shoulders, radiating to the elbows, brought on by exertion. One patient had pain in the left arm from the shoulder to the elbow with exertion. Three patients had a sense of chest oppression without pain, coming on with exertion. A certain group of cases represented more unusual pain distribution, and are similar to those previously reported.⁹ Five patients had severe middle epigastric pain without radiation, induced by exertion, three had epigastric pain radiating into the chest and into both arms, and one had epigastric pain radiating through to the back, neck, shoulders, and chest following exertion. One patient had

pain in the upper left abdomen without radiation. In one instance the pain started in the dorsal region of the back, and radiated to the right shoulder and arm. The frequency of atypical pain manifestations in syphilitic aortitis, emphasizes the importance of careful questioning in obtaining histories of diagnostic value.

GENERAL DISCUSSION

The classification adopted for this study is purely arbitrary. It has been based on objective findings to enable us to stress the importance of physical diagnosis, an art which, regrettably, is becoming unpopular. We have already conceded that this classification may not always coincide with the findings of the pathologist with regard to degree and extent of involvement, yet it enables the clinician to group his cases according to apparent damage.

It is important to realize that a long period elapses from the appearance of the primary lesion of syphilis to the onset of symptoms indicative of invasion of the aorta. In this study the average time elapsing from the time of the appearance of the primary lesion to the time of our initial examination was nineteen and one-half years, and in most instances symptoms referable to the cardiovascular system had been present but a few years. It is essential, therefore, always critically to search for cardiovascular involvement in cases of syphilis, and persistently and repeatedly to examine such patients over long periods.

We wish briefly to recapitulate the results of some of our special laboratory methods. The blood Wassermann reactions were strongly positive in ninety-six of the patients, and the spinal fluids of twenty-four of the patients indicated syphilis. In five patients in whom the blood Wassermann reactions were negative, the spinal fluids were positive; the total positive serology was 101 (72 per cent). Larkin and Levy reported positive Wassermann reactions in 90 per cent of patients with syphilitic aortitis demonstrated histologically whose syphilis had existed for about fifteen years. Some of their patients may have been free from objective clinical signs of syphilitic aortitis, thereby bringing the percentage of positive reactions higher. In only twenty-one of the patients did the roentgenograms reveal dilatation of the aorta.

From the foregoing data it is obvious that neither Wassermann reaction nor roentgenography is infallible in the recognition of aortic syphilis. On

the other hand there was no instance in this study in which physical diagnosis failed to reveal evidence indicative of disease of the aorta. These results, we believe, entirely justify our stand in emphasizing the importance of physical diagnosis, which must always rank with the subsidiary yet valuable laboratory adjuncts.

Electrocardiography is helpful only in corroborating advanced disease of the aorta, especially when cicatricial fibrosis has involved the coronary orifices. The most common graphic abnormalities encountered in our cases were significant T wave negativities, occurring in thirty-seven patients; twenty-one of these had angina pectoris. One of us¹⁰ has previously emphasized the frequency of these graphic changes in angina pectoris, presumably due to coronary sclerosis. Our findings in this study also favor the concept repeatedly expressed, that T wave negativity results from myocardial effects produced by changes in the circulation of the heart itself.

In the advanced stage of aortic syphilis particularly, even during intensive treatment for syphilis, subjective, objective, and graphic evidence of progression may often be observed. We have repeatedly noted the onset of anginal attacks, or seizures of paroxysmal dyspnea, and the development of significant T wave negativity in the electrocardiogram. Two possibilities are at once suggested: (1) in advanced aortic syphilis the damage and deformity are so marked in many instances that progression occurs in spite of rigid treatment, and (2) when treatment is effective in controlling the syphilitic process, the resulting reparative fibrosis produces deformity leading to progressive cardiovascular impairment. This is especially true in the atresia of the coronary orifices, often observed at necropsy, when the effect on the heart is identical to that produced by obliterative arteriosclerosis of the coronary arteries themselves.

In the early stage of the disease no cardiac deaths occurred. In the moderately advanced stage, cardiac deaths occurred in 11 per cent of the patients, while in the advanced stage, heart disease produced 48 per cent of the deaths. The total cardiac mortality was 38 per cent.

It is important in this connection that, of the thirty-seven patients having significant T wave negativity in their electrocardiograms, eighteen (49 per cent) have died of heart disease; in other words, 55 per cent of the total cardiac deaths oc-

curred when these changes existed. We have repeatedly called attention to the serious prognostic significance of this graphic abnormality.

We believe that we have submitted data that emphasize the necessity for and the importance of the early recognition of aortic syphilis. The fact that only ten (7 per cent) patients with early syphilitic aortitis were found in this study, that thirty (21 per cent) were in a moderately advanced stage of the disease, and 100 (71 per cent) had advanced aortic involvement, indicates that the early recognition of aortic syphilis is not frequent. Tuohy, in a comprehensive review of aortic disease, has also called attention to the necessity of its early recognition. The frequency with which cardiovascular syphilis is noted, indicates that more intensive and prolonged treatment of all patients with syphilis is necessary, since the prevention of cardiovascular involvement implies, of course, an arrest of the etiologic disease before permanent and irreparable vital damage shall occur.

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DISCUSSION

DR. JOHN A. STOKES: As a student of syphilis watching Dr. Willius' almost uncanny instinct for the earliest signs of aortitis, I have come to appreciate the immeasurable value of expertness in physical diagnosis in the early detection of this, the gravest complication of syphilis. As he says, the ear and not the blood Wassermann reaction or the x-ray,

detects the earliest sign of syphilitic aortic disease. The average diagnosis of syphilitic aortitis is made many years too late for favorable therapeutic results, although by a proper selection of cases even then a presentable showing may be made. Mortality statistics now being collected appear to err in applying new methods for detecting failure to old notions of case selection, making the outlook seem unduly black.

Observation for an aortic lesion should begin in every syphilitic by the second year of his infection regardless of blood findings. The expert opinion of a cardiologist is invaluable in patients who present relapsing or persistent positive blood Wassermann reactions. We should treat latent syphilis within the first two decades of the disease, even though the positive blood Wassermann is the only sign. The vascular involvement which may be present may not be detected until much damage has been done. One should not be misled into overlooking the vascular system because the patient offers some other presenting symptom of syphilis and makes no vascular complaint. In addition to careful physical examination it is well to question syphilitics closely in regard to precordial strain on exertion and shortness of breath, to which they may have given little attention. I know I seem radical, but I believe we should treat vigorously for syphilis, young men with aortic systolic murmurs even in the absence of the grossly obvious history or findings of syphilis, provided a reasonable case may be made out for exposure to the risk of acquiring the disease. At least no harm will be done and often much good. Think of rheumatism late rather than early among the possibilities and give mercury, iodides and arsphenamine the preference over tonsillectomy as a therapeutic test.

That periaortitis is the principal pathologic change in early syphilis of the aorta is shown by therapeutic tests on supposed solid tumors of the mediastinum which develop aneurysmal pulsation with disappearance of symptoms under treatment.

Accentuation of physical signs and even apparent progress of the lesion may take place in treating early syphilitic aortitis. A therapeutic paradox unfolds under your ear, in that the patient with a tambour second sound develops a murmur as healing sclerosis stiffens his aorta and distorts his valves. A patient with a systolic murmur may develop a diastolic bruit and slight temporary decompensation as treatment takes effect. Such signs are confirmatory and observation shows the process to be arrested, not progressive.

Vigorous treatment with mercury and iodide for weeks, followed by arsphenamine in early cases without marked coronary sclerosis or myocardial degeneration, yields excellent results. Arsphenamine is often disastrous in patients with pronounced symptoms of coronary obstruction such as severe and long standing angina pectoris, or with the electrocardiographic evidence of myocardial damage mentioned by Dr. Willius. Death of the patient from the healing of his lesion is the therapeutic paradox which follows the obliteration of a diseased coronary artery by the too rapid effect of modern treatment. Exceptional late cases may through localization of the process high in the aorta escape coronary occlusion and may respond well to intensive measures. We should in general select cases on

the basis of coronary symptoms and electrocardiographic signs, not merely Wassermann tests.

DR. HENRY L. ULRICH, Minneapolis: I am glad Dr. Willius brought this subject up for discussion. Twenty to thirty years ago when they were treating syphilis by waiting until the secondaries appeared, the number of aortitis cases must have been larger than today. Chronic syphilis today has a more subtle aspect than in those days because of the improved therapy. Likewise we must approach the diagnosis of aortitis in a more subtle manner. The physicians of the older schools are to be admired for many things. They knew and recognized aortitis. One of their admirable qualities was their reliance on their eyes, their ears, their hands. We have had the tendency to drift away from fundamental clinical methods and depend on laboratory diagnoses. In aortitis particularly we must get back to the education of our eyes, our hands, and our ears. And the more delicately we train these organs the earlier will be our diagnosis of this disease.

It would be very interesting to know the percentage of aortitis present in the syphilitic clinics today. It would be interesting to check up the therapeutic efficiency of these clinics by the number of patients with aortitis in later years. As the years go by, syphilitic aortitis ought to be a vanishing disease if our therapeutics is correct. Again, how many syphilographers ever warn their patients of the possibility of aortitis or even think of the aorta in the problem of a syphilitic case. Yet syphilitic aortitis is a common finding in visceral syphilis at necropsy.

Clinically it has not been stressed that there are four groups of this disease: aortic, aneurysmal, anginal and cardiac (or valvular). In the cardiac there is the "silent type" in which there are no symptoms referable to the heart. In the cardiac group when there is decompensation the heart rarely comes back; it is the beginning of the end. This is an interesting point and differs in this particular from the rheumatic type of aortic disease.

DR. EDWARD L. TUOHY: This subject of aortitis has interested me for a long time and while there is a great deal that might be said on the subject I think we should confine our attention rather definitely to the points brought out so very well by Dr. Willius. It is very evident from this study and any other study that has been carefully done that early aortitis is largely overlooked and has to be surmised. We know (and it places a heavy responsibility on us) and realize that these late manifestations of aortitis mean that these patients have had something very definite there long before, but we were unable to discover it.

Applying ourselves to the ten per cent and to the definite recommendation made by Dr. Willius that we pay special attention to this exaggerated second aortic tone, I agree with that very heartily. Clifford Alburt refers to it as the "bruit de taburka" and gives the credit for the elucidation to Potain. Tones of any sort are subjective. If we could reproduce these notes so as to vivify them externally we would have something that is not made within our own heads, for comparative study. However, it is only by the keenest education of the ear that this particular tone may be differentiated from various other accentuations. It is difficult and it must come largely through personal experience.

While we are on that point, Hoover, of Cleveland, has had much to say relative to his personal ability to diagnose early aortitis by percussion and that introduces again the personal factor, which is, on the whole, most undeterminative. He also draws attention to this fact that anything that will pull the lung away from the aorta in that region will bring the aorta closer to the chest wall and will therefore accentuate that tone. That is exactly what we get occasionally with apical tuberculosis on the right side and I have seen this phenomenon. That is one place where you would have to be cautious as to whether you have tambour tone or not.

In the second and larger group systolic murmurs should be the subject of careful study because systolic aortic murmurs are usually due to the intimal atheroma and this intimal induration has nothing to do with syphilis. So it is well to point out that wherever we have evidence of general atherosclerosis (eye grounds—peripheral arteries, etc.) we should make these deductions with great care. The young individual with angina (definite angina, before forty-five) will probably, if you observe them long enough, develop syphilitic aortitis and the classical phenomena that go with it. The development of the various other signs are unfortunately all too common.

Regarding the Wassermann test: I have followed a number of individuals in whom I made the proper surmise that they had syphilitic aortitis and did not have the courage to substantiate it definitely because they had a negative Wassermann test. I have watched these patients come back later and they have had definite aortitis. This paper placed the whole matter definitely before us. Certainly we have no easy short-cut to eliminate the difficult problems in early diagnosis as presented in this field.

DR. C. N. HENSEL: There are two or three points that should be emphasized in this excellent paper of Dr. Willius. The first is the fact that his statistics, corroborating other statistics, show about 74 per cent positive Wasser-

manns in the presence of active aortic change. The second is that his group of early cases, which are the important cases to diagnose—because that is the time when treatment is most effective—was only 10 per cent. The third is that he finds the early stages of aortitis are given scant attention. We can easily discover aortic aneurysms or an aortitis with heaving of the arch of the aorta and the more marked signs. These are the cases we may all recognize, but the cases we *should* recognize are the 10 per cent that Dr. Willius tells about; but, as Dr. Tuohy has said, the absence of a positive Wassermann test makes us fearful of going ahead in the treatment of these suspected cases.

I first saw a man, 45 years old, five years ago, whose symptoms were throbbing heart, sternal oppression, weak heart tones and lack of physical endurance, with a large flabby heart, wide at the base. I looked at him through the fluoroscope, but could see no pulsation of the aorta. He had five negative Wassermanns and had three more in other clinics. In 1920 somebody began to give him arsenamine and mercury. I recently looked at his heart under the fluoroscope and now he has a most beautiful pulsating aneurysm of the descending thoracic aorta, with a heart beat of seventy-two, an increase in his physical endurance and apparently the lesion is perfectly compensated. He has had continuous treatment from 1920 on. This man has never had a positive Wassermann. I have three other cases with negative Wassermanns and symptoms of aortitis.

When you get a man from 35 to 45 with substernal oppression or even severe pain deep in the sternum and a muffled aortic second tone, or an aortic regurgitation alone without any mitral involvement you can be suspicious of syphilis. Sometimes a young case, without a history of rheumatism, with no mitral involvement and with but a slight aortic regurgitation and the other combined symptoms, even in the presence of a negative Wassermann, should make us suspicious of syphilis of the aorta and treat for that.

TRICHINOSIS IN NEW YORK STATE

Recently there have come to the attention of the Department reports of three outbreaks of trichinosis in this State; one of these occurred in Rochester, one in Yonkers, and the third in Patterson, a small village in Putnam County. The Rochester epidemic consisted of seven cases in one family, all of whom ate raw pork which had been purchased in a public market about Christmas time. In Yonkers there were ten cases, four of whom were in one family, two in another, and one case in each of four other families. It has been impossible to trace the source of the pork eaten by these people. From investigations made it seems that it had not been purchased in any one establishment; some of it had come from stores which claim to handle only western dressed carcasses; in some instances it is claimed that the pork was a present from friends, and in others that it was purchased in the form of sausage from a peddler from New York City. The Patterson cases were a mother and a 21 months' old baby who ate home-grown pork; no other cases have been found in the neigh-

borhood. Three of the Rochester cases were fatal, while none of those in Westchester County died. Laboratory confirmation having been obtained in all cases there can be no question regarding the diagnosis.

Trichinosis in the human can be prevented only by abstaining from pork which has not been thoroughly cooked; a temperature of 160 degrees F. is necessary to destroy the infecting organisms. The United States Department of Agriculture states that no system of inspection is sufficiently certain in its results to prevent the sale of pork infected with trichinosis.

Health officers and other physicians should be on the lookout for trichinosis. The physician who attended the Yonkers cases states that he is convinced that there have been many cases in Westchester County but which have been diagnosed as gripe. He points out the frequency with which edema of the eyelids occurs in this disease, which, combined with symptoms of so-called gripe, should lead one to have a blood count made at once; if trichinosis is present there will be a well-marked eosinophilia.—*New York Health News*, Vol. 1, No. 7.

THE ANATOMY AND MECHANICS OF FRACTURES OF THE FEMUR*

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St. Paul

In the consideration of any fracture it is impossible to confine the discussion of the lesion merely to the bone itself as the surrounding tissues are the more important factors and are responsible for most of the complications which occur. This is especially true when taking up the anatomy and mechanics of a fracture and the problems of treatment are greatly simplified if these two subjects are thoroughly understood. The object of all treatment is, of course, to put the parts involved into their normal positions and to hold them there while healing is taking place and if one does not know the normal contour of the bone or bones involved or the various factors which tend to prevent the normal anatomy from being obtained it is impossible to intelligently handle any fracture. With fractures of the femur we must not only know the anatomy of the bone and the relation of the muscles, fasciæ, blood-vessels, and nerves to the bone and to each other but also the anatomy of the hip and knee joints and the function of these joints as related to such fractures. A knowledge of the extrinsic and intrinsic forces which cause the femur to break, which cause deformity after fracture has taken place, and which aid or hinder reduction, is also necessary. The physical properties of bone, elasticity and strength, must not be forgotten. No new facts or principles in the anatomy or mechanics of femur fractures can be given, but a brief review of what we already know will serve as an introduction to the papers on treatment which follow.

The femur is the longest and on the whole the strongest bone in the body and is a perfect example of the adaptability of shape to function in the human mechanism. The superincumbent weight of the body must be transmitted through the bone in an infinite number of positions and directions even during the ordinary daily activities of any individual and the forces applied both from the outside and by muscular action are equally numerous. We have therefore a heavy bone with a well marked forward convexity of the shaft and a strong rein-

forcement posteriorly in the form of a bony ridge, the "linea aspera," which latter adds great strength with relatively little increase in weight. The angle of the neck of the femur, which averages about 127 degrees, is necessary in order that the rotations and more complicated motions of the hip can be performed; but to prevent weakening from the angulation at this point a wonderful structural framework has been developed. The cancellous bone with which the head and neck is filled is so arranged that the supporting lamellæ are placed in the line of greatest pressure and by a truss-like arrangement distribute the forces applied through the head to the shaft of the bone. There is also a massing of bone on the under surface of the neck and a reinforcement in the body of the neck in the form of a vertical plate of bone, called by Bigelow the "true neck" of the femur and by Merkel the calcar femorale, by which latter name it is now commonly known. The greater trochanter bears no weight and is consequently very light in structure. The lower end of the femur is, like the head and neck, filled with spongy bone and the walls here become very thin in marked contrast to the thick wall of the shaft. The lamellæ of the condyles run mainly in the vertical and transverse planes.

The hip joint is a ball and socket joint which, although not as mobile as the shoulder, on account of the depth of the acetabulum, allows a remarkably free range of motion. This freedom of motion is a factor which makes possible the efficient use of traction in the treatment of fractures of the shaft of the femur and which allows the greatest liberty to patients when suspended splints are used, for no distorting force can then be transmitted through the joint to the line of fracture until after the limit of motion has been reached. In the knee joint we have almost a pure hinge motion and as long as the collateral ligaments are intact any lateral or rotatory movement of the leg must be directly transmitted to a fracture above the joint. With fractured condyles a knowledge of this stability of the knee joint is of prime importance.

The fascia lata plays an important part in fractures of the femur and a review of its anatomy is necessary if a proper understanding of the mechanical action of traction in treatment is to be understood. This structure, the deep fascia of the thigh, encircles the entire thigh and forms a complete covering for the muscles of the thigh and buttock. It is firmly attached above to the bones and ligaments

*Presented in symposium before the annual meeting of the Minnesota State Medical Association, St. Paul, October, 1923.

of the pelvis and is continuous below with the fascia of the leg but is also attached to the borders of the patella. The lateral portion of the fascia is greatly thickened and is known as the ilio-tibial band. To the upper part of this is attached the tensor fasciæ latæ and part of the gluteus maximus muscles. There are two strong bands of connective tissue connecting the femur with the fascia lata and these act as septa between the muscle bundles. One of these, the medial intermuscular septum, runs from the medial lip of the linea aspera between the adductor magnus and the vastus internus muscles, and the other, the lateral intermuscular septum, from the lateral lip between the short head of the biceps and the vastus externus muscles so that the extensor group is separated from the flexors and adductors. The importance of this great fibrous sheath with its longitudinal attachments to the femur by means of the intermuscular septa is readily seen. The muscle bundles which fill the compartments between the connective tissue septa are not only held in their proper place but the forces acting through them are guided and modified by this structure. The normal tenseness of the fascia is relaxed whenever a fracture of the femur with shortening occurs and it is then that the various degrees of deformity can take place. Traction on the extremity will tighten the fascia and this structure will then tend to mold the muscles and other structures into their normal positions. The tension on the muscles caused by traction is, of course, also an important factor but the rôle of the fascia lata cannot be minimized. If we can imagine a thigh with all the muscles removed but with the fasciæ still intact we can visualize what must take place when we have a fracture of the femur. With the tension relaxed any amount of deformity or shortening can be obtained but when traction is made on the limb this is overcome and the femur will at least approximate the normal contour on account of the action of the intermuscular septa attached to the linea aspera.

The blood-vessels and nerves of the thigh are sometimes, although rarely, injured in fractures of the femur as they occur in civil life. These injuries, when they are present, usually follow fractures in the lower third of the bone as it is here that the relation of the bone to the vessels and nerves is most intimate. The popliteal artery and vein and the internal popliteal nerve, in the order named, are the structures most likely to be involved

for they lie practically on the popliteal space of the femur and can apparently be easily torn or pressed upon by the posterior displacement of the lower fragment in supra-condylar fractures or later involved in the callus formation. The rarity of such injuries, however, seems to show that this danger has probably been over-emphasized.

The muscles of the thigh need not be taken up from a purely anatomical standpoint as the discussion of the various fractures will bring out the important points in their relation to such fractures. In the vast majority of femur fractures there must be shortening of the extremity due to the powerful pull of the muscles running from the pelvis to the tibia and also to the force exerted by the muscles having their origins or attachments on the femur itself although these latter contribute more to the deviating deformities.

All types of fracture, from simple fissures to extreme comminution, have been described in the femur. No portion of the bone escapes fracture but there are some locations which are involved more frequently than others and as a result certain typical fractures are usually described. The mechanism and anatomy of only the more important of these can be taken up at this time.

Fractures of the neck of the femur are usually caused by direct falls or blows on the greater trochanter but there are also many cases on record where more indirect forces have produced these lesions. In the aged, where we always find absorption of the calcar femorale, thinning of the cortical bone, and a fatty degeneration of the cancellous bone, very slight injuries may result in severe fractures, and falls on the knee, the forcing of the extremes of all the motions except flexion, and muscular action, although rarely, can be causative factors. If the fracture is near the head (the so-called subcapital type), the fragments may be impacted by the driving of the denser neck into the head or be found in any degree of separation. Usually a part of the periosteum remains intact and the circulation to the head fragment is thus maintained. Impaction itself has no relation to the viability of the head as the circulation must come from the periosteum. Fractures at or near the base of the neck usually result in the firm bone of the neck being driven into the cancellous tissue of the greater trochanter and thereby frequently causing a splitting of the latter and the formation of several other secondary fractures. The trochanter may be sepa-

rated and drawn inward and the lesser trochanter may be split off with a portion of the shaft by the wedging action of the fragments. The old classification of intra- and extra-capsular fractures is one that cannot be followed, as a true extracapsular lesion of the neck is anatomically impossible and for the purposes of treatment and prognosis this division is of no importance. Most fractures of the neck of the femur show a rather typical deformity of shortening and eversion. This eversion is not only due to the action of the external rotators of the thigh and the weight of the limb but also to the fact that compression and comminution is more extensive in the posterior part of the neck on account of the more fragile bone in this location. The shortening is mainly due to the glutei, adductors, rectus femoris, and the hamstrings.

Isolated fracture of the greater trochanter is rare but can be caused either by direct blow or by muscular action. Separation of the fragment is not as a rule great, due to the tendinous fibers which so envelop it and the adjoining shaft. The lesser trochanter is fractured even more uncommonly but a few cases have been reported where the pull of the psoas and iliacus muscles in attempts to prevent a fall has separated it from the shaft.

Fractures of the shaft of the femur are usually described in three groups: those in the upper third, those near the center, and those in the lower third. Fractures in all these locations may be caused either by direct or indirect violence or, more rarely, muscular action. All types of fracture are common and the pathology depends on the nature of the force causing the break and the part of the shaft involved. In the upper third the line of fracture is typically forward and outward while in the lower third it is forward and downward. In the center the planes are transverse or slightly oblique, and if the latter, the forward and downward line is present. The normal curves of the bone seem to be important factors in causing the obliquity. Displacement and deformity is the rule in all shaft fractures unless the break is transverse without separation of the fragments, or incomplete.

With a fracture in the upper third the rule is that the proximal fragment is displaced forward and outward due to the action of the psoas and iliacus, the two lesser glutei, and the external rotators, all of which are so inserted into this fragment that their combined action tends to cause such a deformity. An important modifying factor, how-

ever, is the action of the distal fragment on the proximal one when the former is drawn upward by the powerful pull of the rectus and hamstring muscles. This pressure increases the angulation and may be strong enough to displace the upper fragment inward or backward in spite of the action of the muscles tending to cause the opposite deformity. The distal fragment in these upper third fractures is displaced as a rule upward and inward and is also everted or externally rotated. This is due principally to the action of the pectineus and the adductor group of muscles which are inserted into the medial lip of the linea aspera although, of course, the retraction is caused mainly by the rectus and the hamstring muscles as just mentioned.

There is no typical deformity in fractures near the center of the femur but in simple types the factors at work are similar to those just described. Fractures in the lower third or just above the condyles, however, show usually a displacement of the distal fragment backward on account of the action of the gastrocnemius and, to a lesser extent, the popliteus and plantaris muscles. The angulation of this fragment is rarely as marked as the diagrams in the text-books would lead us to believe and the pull of the long muscles of the thigh causing retraction and overlapping is a much more important factor. The upper or long fragment changes little in position in this fracture except that it tends toward a position of adduction and slight flexion by the action of the adductor group and the hip flexors. The sharp end of the upper fragment may penetrate the muscles on the front of the thigh and even go into the knee joint.

In all shaft fractures it must not be forgotten that the line of fracture influences the displacement to a great extent and the typical deformities and displacements just described are frequently absent on this account. The fragments tend to slide apart, when retraction takes place, along the line of the obliquity of the fracture and if this obliquity acts contrary to the usual deforming forces the latter are overcome or altered. The primary fracturing force may also be so severe that the fragments are driven into unusual positions. If a certain amount of periosteum is left connecting the fragments of a fracture this tends to hold the ends close together and although marked angulation may take place large degrees of over-riding are impossible. Gravity is also a force not to be overlooked as a deforming factor and the posterior bowing which must be

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fought against constantly in the treatment of shaft fractures is largely due to this cause.

Fractures of the lower end of the femur are not so important as those of the shaft or neck from a mechanical or anatomical standpoint as the causative factors are practically always some form of direct violence and displacement when present is due to this violence. The usual lesions are fractures of one or both condyles and the intercondylar fracture. This latter may be associated with a supra-condylar fracture and be secondary to it, as the force can be so great, as in a fall from a height, that the lower end of the shaft is driven between the condyles like a wedge. A fissure with more or less separation of the fragments results.

The present absurd state of affairs cannot be allowed to continue, of waiting until a child enters school to find defects which should have been recognized and corrected years before. We therefore, as health officers, stand solidly back of any movement which will make it accepted practice to have the family physician not give up his responsibility when the baby is one year old, but have him continue his visits, at least once a year thereafter, for the recognition and correction of defects and for general advice concerning the child's welfare. If this is done, most children will enter school well nourished and without defects which handicap them in their progress and which, if corrected during the school session, involve weeks of inefficiency until there has been recovery from the operation itself and time for the benefits to develop.—E. C. Levy, M.D., *Am. Jour. Pub. Health*, Dec., 1923.

The American Medical Association is now in its seventy-seventh year. Surely there must be some reason for the continued existence of medical organization in this country. Surely it has a destiny to fulfil and I believe it will fulfil its destiny. I am not one of those that believe that the medical profession has lost the confidence and esteem of the public, the real medical profession, but I do believe that there are tendencies cropping out here and there and yonder which need to be stemmed and that it is the job of the medical organizations to initiate measures that will stem and correct them.

That is not only my opinion, that is my conviction, and I want to say, gentlemen, while it occurs to me, that we need as much as anything else in the medical profession and in medical organizations men with convictions. Everybody has opinions, few have convictions. Opinions will not get us anywhere. It takes convictions to put things over; organized medicine needs convictions. We need leaders in our county, district, state and national associations with convictions, militant men who will initiate the measures that may be needed to correct untoward tendencies upon the part of a few, those that bring reproach upon the whole profession. There is a big job for medical organization today within the profession itself.—Dr. Olin West, Secretary A. M. A.—*From M. S. M. A. Address*, 1923.

THE NON-OPERATIVE TREATMENT OF RECENT FRACTURES OF THE FEMUR*

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Notable improvement in the treatment of fractures has resulted from experience gained in the World War, especially in recent compound, comminuted and infected fractures. The mortality is less and the permanent disability and period of convalescence considerably shorter. So much has been published concerning this matter that even the public has become informed of modern methods of treatment, with the result that patients, insurance and compensation adjusters, and employers are demanding better and quicker function.

The value of reconstruction surgery is recognized and appreciated; however, by a proper appreciation of conservative and non-operative methods in the care of fractures of the femur, immediate operation and the necessity for reconstruction surgery may often be avoided. Each fracture is a problem in itself; the treatment varies, and the attending surgeon is best able to judge of his ability to obtain the desired results with the means at his disposal. Methods possible in hospital practice may be impractical for the general practitioner in treating isolated patients.

CAUSES OF COMPLICATIONS FOLLOWING TREATMENT OF FRACTURES

Seventy-five per cent of cases of fracture of the femur at the Mayo Clinic present malunion, non-union, delayed union, chronic osteomyelitis, or joint stiffness following treatment elsewhere. A study of the causes of such failure demonstrates incomplete reduction and imperfect fixation or retention when first treated. Infection in compound or operative fractures often results in malunion and osteomyelitis. Improper internal fixation and inefficient postoperative retention or external fixation are not uncommon. Failure to recognize fractures of the femoral neck, and too early weight-bearing are occasional causes of non-union and coxa vara. Henderson has reported 1,000 cases of old fractures, 221 of which were of non-union of the various long bones. Of 120 cases of ununited fracture of the hip, only twenty-six were considered

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surgical; ninety-four patients were dismissed since their condition was considered non-surgical. Henderson says, "There is no reason why, in the majority of cases, bony union cannot be obtained in the neck of the femur, if proper fixation is provided after reduction of the fracture." In 222 consecutive cases of fracture of the femur, fifty-seven were recent, the remaining 165 were mal-united or ununited, and the result of treatment elsewhere. Our experience in the Clinic, therefore, may be considered greater along the lines of complications following fractures, and reconstruction; and such an opportunity to study the cases should afford an insight into the causes of failure of treatment of recent fractures, and the means of avoiding them.

AGE AS A FACTOR IN UNION AND DEFORMITY

In the care of femoral fractures the age of the patient is of considerable importance. It is common knowledge that union occurs more rapidly and easily in youth than in old age. Fractures involving the epiphyseal line before a person is fully grown may result in mal-development and bony deformity with joint incongruity, and epiphyseal separation or fracture without displacement should be looked for. Deformity in later life, of slow development, may often be traced back to injury in youth, and radiograms will reveal damaged growth of epiphyseal ends, not uncommonly seen as genu valgum or varum, or coxa vara. Greenstick fractures are common in children, rare in adults. The patient's age sometimes determines the type of treatment; children endure recumbency, fixation, and so forth, far better than do older persons, as demonstrated by the relative infrequency of bed sores and hypostatic congestion. The average healthy adult desires freedom from apparatus and complains bitterly of the recumbency and confinement. In the growth of the shaft, nature has shown a tendency to straighten the less deformed malunions. In the aged, it is sometimes best entirely to disregard the fracture and to treat the patient, accepting deformity in order to save life.

SITE AND TYPES OF FRACTURES

The site and type of fractures demand consideration. The more common fractures of the femur may be classified into three main groups: simple, compound, and pathologic. More specifically they may be considered as transverse, spiral, comminuted or infected, extra- or intra-articular, or epiphyseal.

The usual sites of femoral fractures are: (1) the head and neck (epiphyseal separation); (2) the trochanter (trans-trochanteric, with or without separation of the lesser or greater trochanter); (3) the shaft (upper, middle and lower third), and (4) the condyle (lower shaft).

Estes has reported 584 cases of fracture, including 100 of fracture of the neck, nineteen through the trochanter, 457 of the shaft, and eight of the condyles. He found transverse types common, and spiral and longitudinal types rare.

The position of the fracture is influenced by muscular pull and the weight of the lower extremity, and a thorough knowledge of anatomy is essential if the various forms of treatment are to be applied in such a way as to insure proper results. The difficulty in standardizing treatment is obvious, if one attempts to deal with the age of the patient, and the duration, site, and types of fractures.

TREATMENT

The routine examination and treatment used at the Clinic in all cases of fracture are as follows:

A roentgenologic examination is made on admission, before the application of permanent apparatus, and after applying a temporary splint to relieve pain. A general examination is made, and the history taken, if possible, while the roentgen-ray plates are being developed. As soon as possible after ascertaining the type and location of the fracture, and assuring ourselves of the patient's general condition, anesthesia is given, and the fracture reduced. Roentgenograms are made following reduction and application of apparatus as a record, to assure ourselves and the patient that reduction has been effected. The apparatus is examined several times daily to insure proper function. Measurements are recorded from time to time, as shortening indicates bowing or slipping by of fragments. The circulation is watched, as tight-fitting apparatus interferes with rapid union, makes the patient uncomfortable, his joints stiff, and so forth. Roentgenograms are made on the fifth day, and repeated at intervals thereafter, as the judgment of the surgeon dictates, and always at the time of dismissal. The Wassermann test is made. The details of convalescence, complications, and so forth, are noted from time to time. The extremity is elevated whenever possible, thus improving circulation, preventing edema, and aiding the nurse in the care of the patient. The patient is treated on the Bradford frame and apparatus (Fig. 1),

which can be raised and lowered for the use of the bed pan, for transportation, and so forth, thus aiding the maintenance of reduction by eliminating strain. The union is tested to corroborate the roentgen-ray findings with regard to union before the patient is dismissed. Routine roentgenograms are made at right angles; often the anterior view shows apparent reduction while the side view shows malposition. Weight-bearing is permitted gradually at the beginning of the ambulatory period. An accurate record of the condition, such as length

followed by long convalescence, and not infrequently by permanent partial disability, due to stiffness of the knee, fibrous union or non-union, and shortening. We have come to regard impacted fractures with suspicion and, unless satisfied of the excellent position of the fragments, prefer to break them up, unless the patient's general condition, such as age or constitutional disease, indicates the more conservative treatment. Routine roentgenograms of injuries in the region of the hip have often led to the discovery of an impacted fracture which

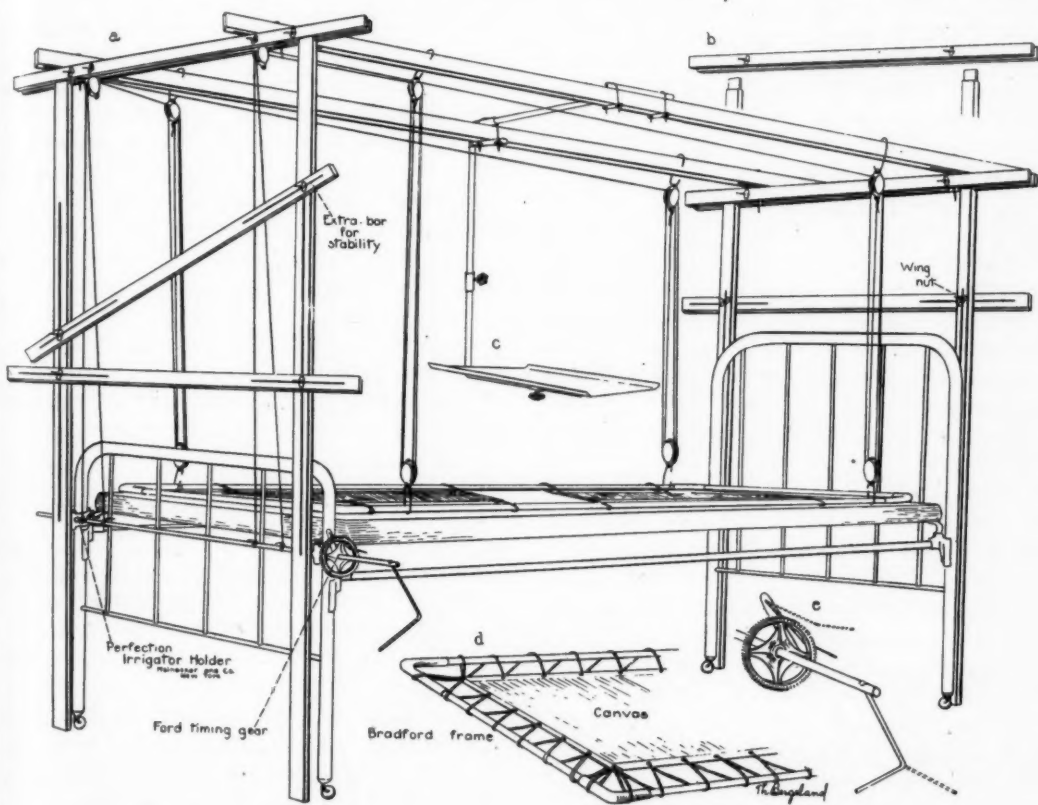


Fig. 1. Modified Balkan frame used with Bradford frame, the latter being raised by crank and pulleys. Adjustable food and reading table. (a) Balkan frame. (b) Method of knocking down frame. (c) Table. (d) Bradford frame. (e) Gear with "dog" and adjustable crank.

of extremities, and mobility of joints, is made when the patient is dismissed from observation. With such treatment carefully carried out, the patient will secure good results, and with such records available, the physician will be protected against any future complaint.

Fracture of the head, neck, or trochanter.—Fractures of the femoral head, neck, or trochanter are

otherwise would have been overlooked, and which accounts for retarded convalescence following so-called sprains, and the later development of non-union and coxa vara. For fractures of the head and neck, the Whitman reduction and fixation method is used almost exclusively in the Clinic; it affords excellent results, and is applicable in most instances. The Ruth-Maxwell method has

also been employed; if it is watched carefully, it is no doubt excellent. Once the Whitman cast has been applied with proper reduction, little care is required, other than prevention of pressure, sores over the sacrum, and stiffness of the knee. We apply the cast from the mid-thorax to the toes on the affected side, and to the knee of the sound leg (Fig. 2); a large window is left to permit massage of the patella, and the sacrum is well padded with

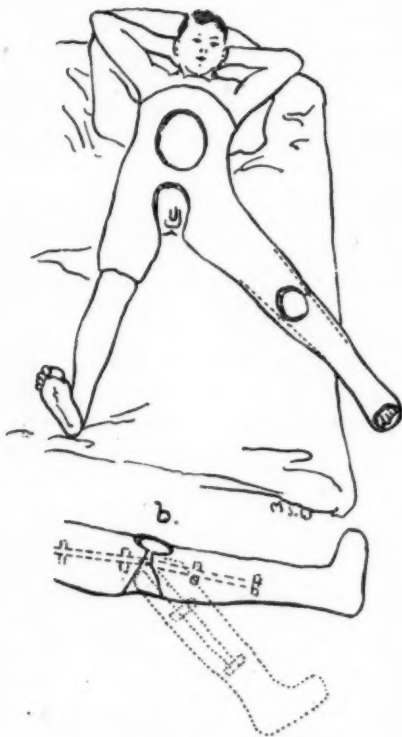


Fig. 2. (a) Cast applied, following Whitman reduction, extends from the thorax to the toes on the fractured side and to the knee on the sound side. A large window is left over the patella and the abdomen. (b) Author's method of preventing knee stiffness by means of hinges placed in the cast; later the cast is cut so as to allow knee motion.

soft felt. Care is taken to maintain the lumbar curve; in obtaining this, the back rest I devised is of value. After six or eight weeks, a pair of metal joints are placed on either side of the knee, and held by plaster until firmly fixed; enough plaster is then cut away to allow motion at the knee, thus preventing the stiffness at the joint sometimes noted. Casts are changed when the surgeon deems it necessary; usually the sound leg is allowed to remain out of the cast at the end of three months.

Abduction is maintained with internal rotation and extension until union is firm. A walking caliper is useful during the first ambulatory months, and should be so applied as to take weight off the femur and put it on the ischium. During treatment, foot drop should be prevented by keeping the foot at right angles to the tibia; if a cast is used, the heel should be well padded to prevent pressure sores, or a window should be left over it for observation. The head of the fibula also requires padding, as at this point there is danger of prolonged pressure causing peroneal nerve paralysis.

The time required for fixation is, I believe, uncertain, and must be left to the judgment of the surgeon. However, from two to four months for children, and from five to seven months for adults, may be required in order to obtain a satisfactory result. Recumbency is not necessary during the entire period. The patient should use the Thomas walking caliper splint as soon as, in the judgment of the surgeon, he is fit to walk, and union is firm.

Fractures through the trochanters respond to traction well, and with the use of the Thomas splint, excellent results are obtained. The limb should usually be placed in a position of abduction, and sufficient traction maintained to secure equal length. The degree of union, which is usually rapid, is best judged by the aid of roentgenograms. The walking caliper, fitted so as to take off weight in the ambulatory stage, is excellent. Traction is obtained by adhesive plaster, Sinclair glue, the ice tong, or the Steinman pin. I believe the ice tong to be preferable, as it allows motion of the knee and traction without pain, and does not irritate the skin (Fig. 3). Transtrochanteric fractures may lead to formidable complications unless pulled down to accurate position; malunion requires osteotomy and reapplication of traction.

Fracture of the greater trochanter or separation of its epiphysis is uncommon, and may usually be treated by fixation in abduction with a firm pad over the site of fracture. When marked displacement is apparent following fixation, open operation may be resorted to. The lesser trochanter is rarely fractured, unless as a complication of comminuted fractures, when the treatment is directed toward the injury of the shaft.

Fractures of the femoral shaft.—These are usually transverse, the upper fragment being carried forward and outward with slight external rotation. Traction in the axis of the upper fragment is usual-

ly sufficient to overcome shortening, and will reduce the fracture unless interposition of muscle has occurred. It is better to reduce the fracture and apply the apparatus under anesthesia, as this gives the surgeon an opportunity to manipulate thoroughly, to stretch muscles, and to apply traction painlessly. Temporary traction to prevent shock

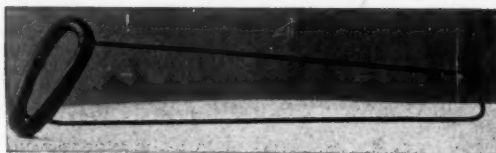


Fig. 4. Thomas extension splint.

or further damage to soft tissues is indicated during transportation. The Thomas splint should be carried in all ambulances and be available in hospitals for emergency purposes. The temporary traction is readily applied in emergency practice with the Thomas extension splint (Fig. 4). Such care lowered the mortality in cases of compound comminuted fractures during the war, and saved thousands of useful limbs. There is no question as to the value of the Thomas splint in emergency fractures, especially the compound comminuted; it has supplanted lateral splints, plaster-of-Paris, box splints, and so forth, in most of the clinics in this country. The surgeon in private practice has sometimes found the extension traction treatment extremely difficult, as constant care and supervision are required to maintain reduction and prevent relatives and friends from interfering with apparatus. Even in hospital practice, team work is required in order to secure and maintain reduction, and, as a result, special clinics for the treatment of fractures have been formed in various institutions with an especially trained personnel. Such grouping will no doubt result in a more or less standardized treatment in hospitals, and in the better care of the patient.

Simple traction or manipulation may not properly reduce the fracture. I have observed equal length with muscle between the fragments, and, in spite of careful manipulation, found it necessary to operate when it could be demonstrated that muscle and periosteum were interposed. Muscle is not always removed from between the fragments with traction. Further, muscle intervention delays union and may produce malunion or non-union. Kidner and Lakoff have reported six cases of muscle interposition, and believe that crushing and twisting are the principal causes. We operate for open reduction when, after reasonable effort, the roentgen rays show unsatisfactory position, and the time since fracture has been short. Such operations should be performed before organization of the clot or callous formation.

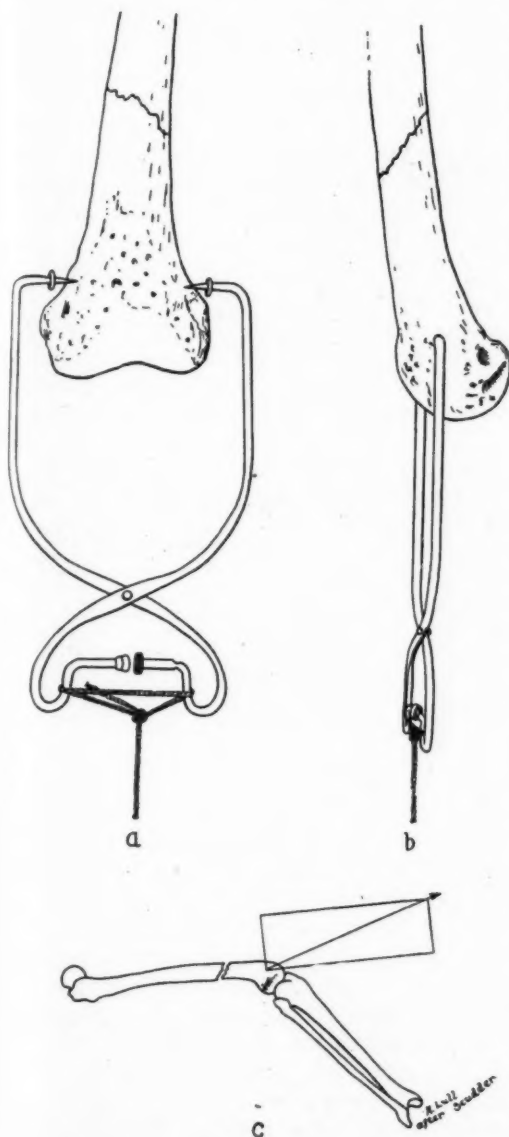


Fig. 3. (a) Ice tongs traction applied. Anterior view. (b) Lateral view showing ice tong slightly anterior to the axis of the femur, so as to pull the upper end of the lower fragment anteriorly. (c) Result of force applied in fracture of lower shaft of femur.

Although the Thomas splint has, to a large extent, supplanted the lateral splint, plaster-of-Paris, and Buck's extension, we nevertheless continue to use them occasionally. In children, fractures of the shaft are successfully treated by the Bryant suspension, as has been shown by Burdick and Siris. Fixation in plaster after reduction was formerly considered an excellent method, and will continue to be used by many. Care should be taken whenever windows are left in casts for observation of wounds, that bowing or rotation does not take place.

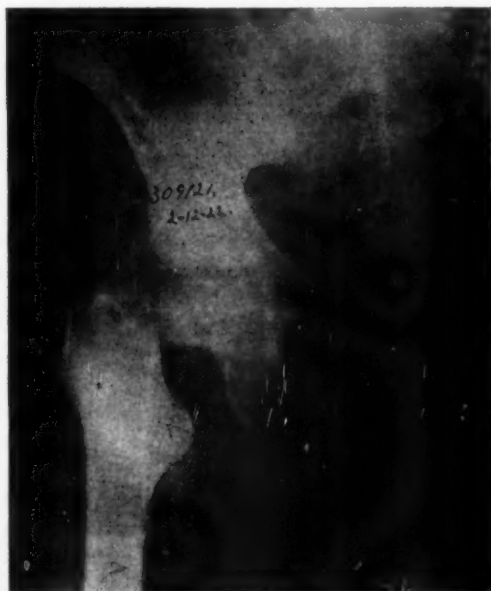


Fig. 5 (Case 1). (a) Fracture of the neck of the femur. (b) After reduction, showing anatomic reposition. In (b) the roentgenogram was taken through plaster-of-Paris cast.

Traction may be obtained by means of adhesive plaster or moleskin, Sinclair glue, plaster cast, Hodgen's splint and pressure against the calf, ice tongs, Steinman pin, or the Finocchetto stirrup. In most instances skin traction may well be extended beyond the site of fracture, as skin is elastic and gives readily; this is especially true when anesthesia is given, and reduction and traction made before the extension apparatus is applied. The skin should be prepared by shaving and washing to remove hair and grease, and the adhesive changed occasionally to prevent irritation.

Care should be taken when adhesive extends over the peroneal nerve, and pressure over the malleoli

should be avoided. We have used an oblong block of $\frac{3}{8}$ -inch wood, wide enough to keep the adhesive off the malleoli, and prefer two or three thicknesses of adhesive and a carefully applied boot of adhesive, open in front, rather than two or three strips applied about the leg. We use Buck's extension frequently. We have also used Sinclair's glue and find it excellent in its adhesive qualities, but, like paint, it is messy and slow. Ice-tong traction, combined with the Thomas splint, is no doubt most efficient, and less apt to carry infection into the cancellous bone than the Steinman pin. The Wil-

cox universal splint deserves consideration, as it is applicable to the arm as well as to the leg. A properly fitted ring will, however, be found of greater comfort. As I have already stated, we have had difficulty in obtaining reduction by traction alone, and prefer anesthesia and manipulation, using the traction to maintain reduction. The amount of traction may be reduced after a few days; otherwise, overlength may result. In spiral fractures, even after equal length has been obtained, the bone often remains separated one-half to three-fourths of an inch. Further traction may even lengthen the leg without coaptation. When flannel supports or aluminum strips beneath the

fracture site fail, we apply a sliding ring to the splint and, by means of plates screwed against the thigh, force the fragments from any angle into position. Flannel bands may similarly be applied and run over a pulley with weights sufficient to cause correction. When applying the Sinclair modification of the Thomas splint, care should be taken to support the knee properly, to keep the foot and ankles at right angles, and to have the joint of the splint directly over the middle of the knee joint. One of the principal difficulties in the care of fractures of the shaft is backward bowing, and sufficient support behind the site of fracture, either by flannel bands, aluminum bands, or overhead traction, is essential.

Fractures of the lower shaft and condyles.—In fractures of the lower shaft and condyles, the upper end of the lower fragment is practically always displaced backward, the sharp edge of the fracture resting on the nerves and blood vessels. Anesthesia is essential in reduction, to relieve muscle spasm. Pressure is to be avoided over the fractured ends, lest more injury to soft parts be produced. Gradual traction, with the knee partly flexed, and the assistant bearing down on the shaft above the fracture while the surgeon forces upward with his hand under the condyles, will usually accomplish reduction. Certain spiral or slanting fractures may force the lower fragment upward and to the side; in such cases, traction is essential, with knee flexion. However, should difficulty be encountered, and reduction be unsuccessful, open operation is indicated. Reduction is perhaps best maintained by the use of a double inclined plane, either as half cast, wooden wedge, modified Hodgen splint, or Sinclair modification of Thomas splint; the latter is perhaps the best. The great advantage in using the ice tongs or Steinman pin in fractures in the lower femur lies in the avoidance of stiffness in the knee. Charbonnier has obtained satisfactory reduction with the Steinman pin in 85 per cent of his cases, with no serious after results, union taking place in from twenty-five to fifty days, and Dennis Crile reports 300 cases reduced without difficulty. The insertion of these appliances in fractures of the lower shaft should be anterior to the middle axis of the femur, so as to pull the upper end of the lower fragment forward.

Anterior displacement of the lower epiphysis.—Reduction in these cases is difficult, and should not be attempted without anesthesia. After the patient

is thoroughly relaxed, traction is made with the knee slightly flexed by the assistant, while the surgeon grasps the leg with both hands just above the epiphyseal line, and with thumbs on either side forces the epiphysis downward over the end of the femur. The leg is then put up in right angle flexion and maintained in this position for several weeks, after which gentle motion is begun. Should it be impossible to manipulate the epiphysis into position, I have no hesitation in opening through a lateral incision to reduce the fracture, and I secure fixation in anatomical reposition by means of beef-bone screws.

Intra-articular fractures.—Unless intra-articular fractures are perfectly reduced, they lead to permanent partial disability, and therefore the use of conservative splints, casts, and so forth is, we believe, fast losing ground in favor of open reduction and internal fixation.

Compound fractures.—Our method of caring for compound fractures may be summarized as follows:

With a sterile gauze pack, saturated in Dakin's solution or iodine, over the wound, the surrounding skin is shaved and cleansed. The protruding bone and tissue is thoroughly washed with a large quantity of Dakin's or a solution of iodine. The soiled tissue and small fragments of bone are excised.



Fig. 6 (Case 2). Result eleven months after fracture of the hip. Good function.

The fracture is then immediately reduced, under anesthesia, and suitable apparatus applied. If the wound has been extensively soiled and the surgeon does not believe he obtained a clean wound by the foregoing measures, the wound is Dakinized and

packed for forty-eight hours. The wound is then allowed to close of itself, or is loosely sutured and left alone. Fifteen hundred units of anti-tetanic serum is given. Intra-articular wounds are not Dakinized. Iodin may be used instead of Dakin's solution to cleanse or wash the wound before and after débridement.

REPORT OF CASES

Case 1. Mrs. C. A., aged seventy years, fell on an icy sidewalk in February, 1922, fracturing the right hip. The characteristic eversion, shortening, and so forth, were present. A roentgen-ray revealed fracture of the neck with upward displacement.

The patient was anesthetized and Whitman manipulation performed; a cast was applied extending to the knee on the sound side and to the toes on the fractured side. Windows were left over the abdomen and patella. Part of the cast around the knee was removed, side hinges were inserted, and knee motion begun at the end of eight weeks. The patient, being old and feeble, was permitted to be moved about in a wheel chair. At the end of the third month of treatment, all apparatus was discarded because of the patient's general health; the legs were of equal length, and as union was apparently firm, she was encouraged to walk with crutches. At the end of six months, she was dismissed as cured, walking.

Comment.—Treatment was abandoned at the end of the third month, yet a perfect result was obtained in six months. This case illustrates the occasional necessity of treating the patient first and the fracture second (Fig. 5).

Case 2. Mrs. M. C., aged fifty-one years, fell and injured her left hip January 19, 1921. A roentgen ray revealed fracture of the neck of the femur. There was eversion and three-fourths of an inch shortening. Extension with internal rotation was applied until abdominal distention, nausea, leukocytosis and complicating symptoms cleared up. January 28 the fracture was reduced by the Whitman method, and a cast applied. The cast was changed April 27 and May 18. September 21 union was firm and the patient was walking with a cane. She has made excellent recovery with one-half inch shortening.

Comment.—The patient sustained several falls during convalescence, following which knee motion was improved. A cast was not applied and the patient was not subjected to anesthesia until I was convinced that her general condition was satisfactory. The roentgen-ray shows the result after eleven months (Fig. 6).

Case 3. A plasterer, aged forty years, fell eight feet, and struck on his right hip. He was brought into the hospital at once. Examination showed outward rotation of the right leg without shortening, pain in the hip, and inability to raise the leg from the bed. Roentgenograms revealed an impacted fracture in excellent position. With equal length and excellent position, there seemed to be no indication for breaking up the impaction. Treatment consisted of traction with a Thomas splint.

The patient left the hospital the second week, to continue treatment at home. He was observed from time to time,

and roentgenograms were made. At the end of nine weeks he was up and about, walking on crutches with the aid of a caliper splint. At the end of one year, union was perfect, and the position correct, with equal length, good motion in the joint, and no atrophy.

Comment.—This case is cited to show that, although the Whitman method is a practical standard, and we are suspicious of every impacted fracture of the hip joint, many of which require manipulation, yet there are exceptions to the rule. The ultimate result is shown in Figure 7.

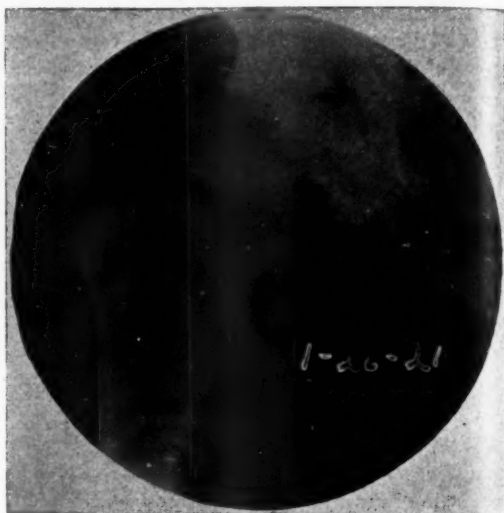


Fig. 7 (Case 3). Roentgenogram showing impacted fracture of neck of femur.

Case 4. A boy, aged six years, fell off a wagon into the spokes of a wheel. A roentgenogram, anterior view only, was taken by his physician, and no fracture found. A splint was applied for two weeks, and the patient then advised to walk.

At examination, during the fifth week, the left knee was swollen and tender, with anterior displacement of the epiphysis. The malunion was broken up through a lateral incision and the epiphyseal separation reduced. Within six months 90 degrees motion resulted.

Comment.—This case illustrates the advisability of always taking anterior and lateral roentgenograms (Fig. 8).

Case 5. A farmer, aged forty-two years, was brought about fifty miles by automobile to the Clinic by his family physician. He had sustained compound comminuted fractures of the left tibia and fibula with dislocation of the ankle joint and multiple lacerations of the legs. The right femur was fractured at the juncture of the lower and middle thirds. The accident occurred in the morning, and he arrived at the Clinic in the evening, dressings and splints having already been applied.

Roentgenograms were taken immediately, anti-tetanic serum was given, and the patient was prepared for operation on the left leg. Through two lateral incisions, the fractures of the tibia and fibula, and the dislocation were reduced, and held by a nail and Parham-Martin band; the

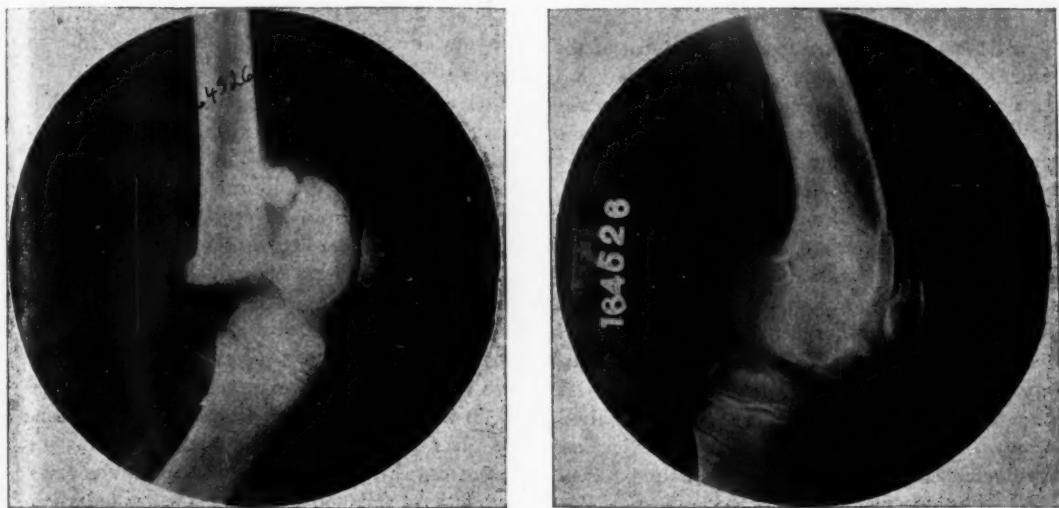


Fig. 8 (Case 4). (a) Lateral view showing lower epiphyseal separation of femur. (b) Result, one year after reduction. Note anterior bowing of femur as a result of damage to epiphysis.

fractured femur was placed in a plaster-of-Paris cast with the knee slightly flexed. Eight pounds of extension was applied to the suspended right leg through the cast. There was no infection. A month later a Sinclair modification of the Thomas splint was applied and active knee motion begun, and continued until the seventh week. The patient then returned home with the cast split into anterior and posterior halves, having been advised to remain off his feet.

The patient returned seven weeks later, having walked on both legs. The right femur remained firmly united in spite of bearing most of his weight. The left tibia bowed out-

ward. The patient was operated on and the Parham band and nail were removed. The tibia and fibula were manipulated into position and a cast was applied. The patient went home the fourth week under the home physician's observation.

Comment.—Surgery of the left leg was indicated, and amputation was considered. However, infection did not result in spite of the crushing and soiled comminuted fractures with dislocation. Conservative treatment of the left femur resulted in early function and good knee motion (Fig. 9).



Fig. 9 (Case 5). Result of conservative, non-operative treatment of fracture in lower third of femur. Anterior and lateral views.

SUMMARY AND CONCLUSIONS

In the conservative treatment of fractures of the femur, after the patient's general condition has been considered, and roentgenograms taken, immediate reduction should be undertaken, and anatomic reposition obtained, if possible, and maintained by suitable apparatus, to prevent stiffness of joints, useless atrophy, pressure sores, and so forth. To correct deformity properly, and maintain reduction, the anatomy must always be carefully considered. Anatomic reposition is, of course, the desired end, but good function may be obtained without perfect reduction. The patient's temporary comfort should not be allowed to interfere with the ultimate result, for although the force required to overcome muscle pull in adults often makes traction uncomfortable, inefficient traction and comfort lead to improper reduction and failure.

There is no rule as to when union will occur, but the roentgen ray and clinical findings are helpful guides. Anterior and lateral roentgenograms, before and immediately after reduction, are advisable. Further roentgenograms may be taken at the discretion of the surgeon, but should always be taken at the time of dismissal. The history should be continued throughout treatment, and a careful record of measurements kept.

In cases of fracture below the femoral neck, traction by means of the Thomas splint or its modifications (Fig. 10), such as Sinclair's, is the most efficient conservative treatment. The amount of traction will, of course, vary with the patient. The means of obtaining traction may be skeletal or from the skin; the former is the more efficient. The use of the Thomas traction splint in emergency treatment is of unquestionable value.

Compound fracture should receive immediate cleansing and débridement, and antitetanic serum should be administered to the patient.

Physiotherapy is a valuable aid in the treatment, and in uncomplicated cases, and with the use of a caliper splint or Steinman pin, may be carried on throughout convalescence. If the Thomas splint is used, the skin near the ring should be massaged daily, and soothed with alcohol or talcum. Considerably less atrophy results if daily massage is employed, and as a result of the improved circulation, the time required to obtain firm union is often shortened. The physiotherapist may also help to prevent pressure sores by massaging over the sacrum, even in the presence of a cast. Motion

of joints and gentle massage under supervision also obviate stiffness; this is especially true in cases of old arthritis.

Conservative treatment is more adaptable to children than to adults, for in children slight deformities tend to correct themselves, and joint complaints are rare. However, epiphyseal separation and injury are more common, and may lead to subsequent deformity. Adults require more protracted care than children, and are more difficult to confine. There is less tendency to correction of deformity following union, and greater tendency to static joint complaints. Open operation is, therefore, more often resorted to, except in fractures of the hip, in which treatment by Whitman's method usually gives accurate reduction and retention. In most cases, when a reasonable attempt at conservative treatment fails to provide satisfactory reduction within five or seven days, open reduction is advisable if suitable operating facilities are available.

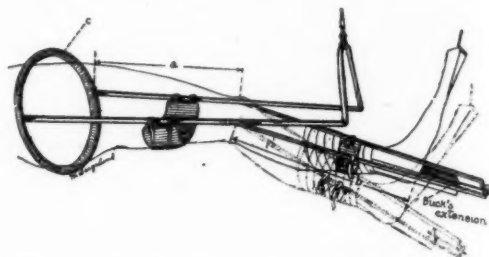


Fig. 10. Modified Thomas splint to allow knee motion.

Our experience at the Clinic has led to the following conclusions:

1. The Whitman treatment of recent fractures of the head and neck is efficient, and open operation is unnecessary.

2. In the recent fractures of the shaft, the non-operative treatment has apparently given more satisfactory results, although a comparison of these cases with those in which operation was performed is unjust, since open reduction was performed in only the more difficult cases. Anesthesia, manipulation and retention by extension with Thomas splints, has been the method of choice in simple fractures. In twenty-seven of twenty-nine simple fractures treated conservatively, the results were satisfactory.

3. Excellent results are obtained in supracondylar or condylar fractures in the lower shaft, by

flexion of the knee and extension. When the Steinman pin or ice tongs are used, they should be accurately placed anterior to the axis of the femur.

4. Unless practically anatomic reposition is obtained in the intra-articular fractures by conservative treatment, arthrotomy and internal fixation is indicated.

5. When, after reasonable attempts, conservative treatment has failed to give satisfactory reduction, open operation, reduction, and fixation is advisable.

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THE OPERATIVE TREATMENT OF FRACTURES OF THE FEMUR*

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If the results obtained in femoral fractures were entirely satisfactory there would not be much point to this symposium. Speed, Eliason, Carroll, Kidner and others have recently published reports of the results obtained in the larger clinics that are worthy of careful study. Eliason describes the routine treatment in the University of Pennsylvania Hospital, which consists of first applying extension and placing the fragments in as good position as possible without the aid of an anesthetic. They are left in this position about three days and then radiographed. In eighty-eight cases so treated, all were found to be in bad position when radiographed. Yet it will be admitted that this simple extension treatment of fractures of the femoral shaft has been depended upon until recently to replace the fragments in their proper position and hold them there. It has been assumed that if a surgeon applied a Buck's extension of say twenty pounds he could not be blamed for any bad result that might accidentally occur. Statistics show a percentage of permanent disability in these fractures, even in the best hospital practice, that ought to fill us with discontent. The bad results are not found in the closed cases alone. Open methods have their full share. Indeed, there has been a reaction against the epidemic of open operations of a few years ago, particularly against the indiscriminate use of the steel plate.

The profession is awaking to the fact that the treatment of fractures has not made the advances of other branches of surgery. One of the reasons for this may be the lack of specialization in this field. Usually the nearest doctor is called and few cases are referred. In the case of thigh fractures, transportation was not only painful but positively dangerous until the Thomas splint came into general use. As a result of everybody treating these cases, few surgeons see enough of any one type to work out comparative results and add much to our scientific knowledge. The current literature on fractures is overwhelming. Differences of opinion are greater than in any other branch of surgery.

*Presented in symposium before the annual meeting of the Minnesota State Medical Association, Saint Paul, October, 1923.

The equipment proposed would fill an instrument shop. The crying need is for simplification of both method and equipment. Until some of the methods have been perfected and others proved inadequate and discarded, standardization can hardly be hoped for. Still the aim of this paper is to offer some suggestions along this line.

The indications for operative treatment are sometimes difficult and at other times obvious. Examples of the latter are compound fractures, true cases of non-union and cases in which there is interposition of soft parts. Open replacement alone offers hopes of a good result in these cases. In oblique fractures traction can almost always be depended upon to give at least a fair result provided the soft parts are not interposed. It is in the case of transverse fracture that decision is most difficult. If repeated manipulations under an anesthetic have been tried and the limb put up in traction with the distal fragment in line with the proximal fragment, still shows displacement, shall an attempt at open operation be tried?

A committee appointed by the British Medical Society to report on the ultimate results obtained in the treatment of simple fractures, with and without operation, presented some interesting conclusions. They are too long to quote in full, but in brief they found the results in children good by the closed method but poor in the case of adults. They stated that "although the functional result may be good with an indifferent anatomical one, the most certain way to obtain a good functional result is to secure a good anatomic one."

In deciding upon operation other factors than the fracture itself must be considered. Of these the age and health of the patient and the skill and equipment of the surgeon are most important. Under equipment are included not only suitable bone instruments but a good hospital, trained assistants, a bedside x-ray outfit and a traction operating table. If operation is indicated so far as all these factors are concerned, the problem must then be put up to the patient himself. He must be made aware of the dangers of the operation while at the same time the probable interference with function and greater possibility of non-union if not operated must be pointed out. It must not be overlooked that repeated manipulations may do more damage to the tissues than open operation.

Due to our war experience many cases can now be handled by the closed method that formerly

would have required open operation. Still we must not expect to exactly copy the results obtained in gunshot wounds. General Bowlby, of the British Army, has called attention to the much greater difficulty in getting full extension in civil fractures than in the lacerated thighs seen in the base hospitals. At the same time bone surgery has made great advances and the dangers of operation have been reduced. Better function is now expected and certain cases must be operated that were formerly allowed to unite in a faulty position.

The multiplicity of methods and appliances for holding the ends in apposition is proof in itself that no one method is entirely satisfactory although many are ingenious and produce good results in the hands of the originators. Only the simplest and most used methods will be mentioned. Some of these attempt not only to hold the ends in apposition but at the same time to actually splint, that is, to prevent angulation by internal means. The steel plate does this most efficiently from a mechanical standpoint and is about the simplest internal splint to introduce. Unfortunately the steel plate has the serious defect of causing irritation and interfering with union. Infections are frequent and the plate must often be removed. The beef bone plate with the threaded beef bone screw is somewhat more difficult of application, more bulky and not as strong but is much less irritating and in most cases is eventually absorbed. The autogenous inlay graft is still less efficient mechanically but has the great advantage that it is non-irritating and is actually stimulating to bone repair. In the case of ununited fractures it is often indispensable. It is usually not a justifiable procedure in a fresh thigh fracture because of its difficulty of application and the extensive dissection required in a thigh to expose a sufficient field through a thick mass of muscles. Unless a sliding graft is used it also necessitates a second incision to remove the graft from the tibia. It has been found that it is not safe to depend upon the splinting effect even of the long steel plate as the powerful thigh muscles will finally produce angulation with loosening of the screws.

The principal methods of end to end approximation are by the short bone or ivory plate, the intermedullary graft and suture. The Magnuson ivory plate method is very efficient mechanically. It consists of a thin ivory plate which is fitted into a keyway cut edgewise in the ends of the bones. It is held in place by special threaded ivory bolts

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screwed in at right angles to the plate through the entire shaft. The method requires special plates and instruments. The intramedullary graft is simple but is physiologically wrong as the periosteum and endosteum must be removed from the graft and the medullary cavity cleaned out at the very point where it should be preserved. Also it is difficult after the graft has been introduced into one end to separate the fragments enough so it can be introduced into the other. This has been accomplished in various ways. The graft has been introduced full length into one end and the fracture reduced. The ends are then pried apart enough so that the graft can be teased back into the other. Another method is the so-called "submarine" graft. A short graft is cut similar to the familiar sliding inlay graft but the incision is not carried down within an inch of the end of the fragment. This is sunk into the medullary cavity and driven endwise into the other fragment. The intermedullary graft has many advocates in fresh fractures and is a method that must be seriously considered because of its simplicity and efficiency.

The mechanical efficiency of simple suture depends to a large extent on the material used and the method employed. Wire is not only a foreign body which is irritating but is difficult to fasten and is apt to kink and break. Soldering the joint, which has recently been suggested, would not help. Of all materials proposed to date, Kangaroo tendon seems to come nearest to meeting the demands. It is remarkably tough and but slightly irritating and, while it is absorbable, it lasts until bone union begins.

Having decided in a given case that open operation is necessary, proceed to get the fragments in place and hold them there in the simplest method possible and yet with a well worked out plan and ready for any contingency. As a rule traction straps should be applied from knee to ankle before operation. The entire thigh should be scrubbed up the day previously and an alcohol pack applied. The operation should be performed on a traction table of the Hawley type. The proper draping of the patient is of great importance in carrying out a clean technique. The leg must be draped so that the various manipulations do not expose unsterile fields. For this purpose the leg below the knee should be wrapped in snug fitting drapes held in place with a sterile bandage and then placed above the sterile sheet. Jones wraps the operative field in

sterile muslin and makes the incision through this. The incision in a shaft fracture will usually be on the outer anterior aspect. Start with a short incision in a transverse fracture as this may be all that is necessary. When the ends are reached remove clots and attempt to pry the fragments into position. In many cases the ends can be locked together and the limb put up without any internal fixation. If they tend to slip they must be fastened. Kangaroo tendon will hold in most cases, if properly applied. The much used method of drilling through the entire shaft from side to side, perhaps an inch from the ends and passing a single strand of wire or other suture through these holes is absolutely futile. The sutures must be introduced so as to prevent lateral movement. After the ends are in good apposition drill holes in pairs close to the fracture line and extending through the cortex only. There should be two pairs of holes placed at least 90 degrees apart on the circumference. When these holes are drilled, relax the extension and allow the ends to angulate out into the wound. It is usually difficult to lace the kangaroo tendon through these holes with a stiff needle. An improvised suture carrier made of a loop of piano wire (heavy tonsil snare wire) firmly set in a hemostat greatly expedites this step. This carrier can be bent into any desired shape and easily slipped through the sharp walled holes either from within or without and the tendon threaded into it and pulled through. Long strands should be used and these should be laced through two or three times. This is important as twice through more than doubles the strength since the knot is the weakest point of any ligature. Once more bring the ends into apposition and draw the sutures just snug and tie. Experiments by the writer have shown the efficiency of sutures so applied. A transverse fracture fastened with three strands of heavy tendon withstood an angulating strain of over twenty pounds applied six inches from the fracture.

Opinions differ as to temporary drainage. Eliason reports that all cases of nonunion or delayed union occurred in his undrained cases. Others have had similar experiences and most operators put in a few strands of silkworm gut.

The strength of simple suture properly applied has been underestimated. If the operator does not feel that it is strong enough in any particular case, it would be best to resort to the steel plate for the transverse fracture and the Parham band for the

oblique because of their strength and ease of application. They should be removed in four to six weeks as they have then accomplished all that they are going to accomplish and union will be stronger if they are removed.

After the fracture has been set and the ends either locked in place or some osteosynthetic method used, the leg must be splinted and the patient got back to bed without disturbing the position. This is a critical step in the treatment. In a certain proportion of cases, a cast will hold the parts in position but it is an uncertain thing. Bowing within the cast will occur in many cases and this may be followed by the ends slipping by. If a window is cut in the cast for dressing the wound, even a strongly plated bone may have the screws pull loose and bulge out through the opening. If the cast is used adhesive straps should be applied under it for traction. It must be recognized that internal fixation by any method yet devised is temporary and that the same principles of external splinting and traction must be carried out or deformity will ultimately occur. All that can be expected of internal fixation is the temporary holding of the ends in approximation until there is beginning union. External splinting and traction must take care of angulation and most of the muscle pull.

Special types of fractures of the femur can only be touched upon in a most sketchy manner in this paper.

In children, fractures of the shaft give excellent results with traction, either perpendicular or flat, and operation is rarely ever required. Even lapped transverse fractures give good function and become almost perfect anatomically in a few years.

In fresh hip fractures operation as a rule is not justifiable. The Whitman abduction method has received almost universal sanction for all cases except the very old. For these the Maxwell-Ruth lateral traction method may be selected. In old fractures of the hip in which there has been no union and the function is poor, the choice lies between attempting union by introducing a dowel pin graft through trochanter and head or implanting the end of the bone into the acetabulum as described by Galloway, Albee and Whitman. Up to date the number of good results obtained with the graft method is small while the implantation method gives fair results in all cases and the period of convalescence is much shortened. The Whitman method seems to be most rational. He chisels off

the trochanter with the abductors still attached. The head is removed from the socket and the end of the femur shaped to fit in it. The trochanter is anchored lower down on the shaft and a cast applied in abduction. The patient can often bear weight on this new joint in two months.

Fractures of the lower end of the shaft can usually be reduced by skeletal traction as demonstrated by Blake. If the reposition following traction with the tongs in the flexed knee position is unsatisfactory, open replacement and suture should be tried. The leg should, of course, again be put up in flexed knee traction.

Ununited fractures of the femur are almost always attended by displacement which tends to recur. For this reason it is necessary not only to place the fragments in the best possible condition for repair but there must be some internal fixation. On this account the efficient thin periosteal grafts used by Chutro and Lariche are contraindicated and the inlay graft with the graft obtained from the tibia should be used. If the strain of complete correction is too great, it is better to cut the ends off and sacrifice some length rather than risk a broken graft and recurrence of the displacement.

The advantages of open operation are obvious in certain cases. Interposition of the soft parts may occur with the fragments so tangled that reposition is only possible by open replacement. Kidner and Lakoff report six out of seventy-one fractures of the femur in which this happened. This condition may be assumed if, after full traction and manipulation, the ends do not touch as shown by rays and palpation. In the case of simple lapping, nonunion is not inevitable but is more apt to occur than if the fractured ends are in contact. If union does occur, not only is there shortening but the function is otherwise interfered with. The quadriceps is shortened and there are fibrous changes in the muscle substance with much restriction of knee motion. As a result there may be static changes in the knee and foot with permanent weakness and lameness. Following a bad position the union may be weak and painful for years.

It should once more be emphasized that the operative treatment does not in any way excuse carelessness in splinting, traction, physiotherapy or active and passive movements. It is but one step in the modern treatment of fractures. Fractures in general and fractures of the femur in particular should be treated by specially equipped men in specially

equipped hospitals. As Scudder says, "Whether by an orthopedically trained surgeon or a surgically trained orthopedist, is of no importance. Fractures are an emergency but the open operation is never an emergency and if lightly undertaken or improperly done, cannot be excused as such."

CLINIC

DR. ALEXANDER COLVIN, St. Paul: If you get a copy of the papers which have just been read after they are printed and then procure a copy of the Archives of Surgery for January, 1921, you will have all there is to know about fractures of the femur and will probably not have very much difficulty in treating them. This article is by Dr. Kellogg Speed of Chicago. So I feel that there is very little for me to say when the ground has been covered so well. However, there are some features that can always be brought out in a clinic, so-called, and I wish to bring those out here.

My first experience with a bad result in fractured femur was many years ago, and although many years have elapsed since that experience, I still get an occasional result which I regret, and that result is always to be regretted. That does not mean that you cannot get bad results that you do not have to regret; but it does mean that there are results which should be regretted. The case to which I refer, a good many years ago, was of a young woman who had a fracture of the shaft about the middle. She was a very disagreeable patient, and whenever I went near this patient to check up and attend to the bandage and the plaster and so on, I had a fight on my hands; and I am afraid that I neglected her. At the end of a month I became very anxious, and did some accurate measuring and found that I had an angular deformity with a shortening of about an inch and a half. That was at the end of a month. I took the patient up to the operating room, anesthetized her and refractured the femur, which was very easily done; then pulled it out into an accurate position; and I got the best result that I ever got in a fracture of the femur, due to the fact that I gave it my immediate attention as long as she was in the hospital afterwards.

This year sometime I saw a man in a private house here under the care of one of the older men, a general practitioner. He had a flatiron for traction, and the adhesive plaster extended halfway up the leg, and the bed was too short. The man was a very ugly kind of man and would not go to the hospital. So I was enabled to give some rather vigorous advice to the doctor over the patient's head, so to speak, and it resulted in getting a long bed, in putting on thirty pounds of weight, and in putting adhesive plaster well up the thigh. I saw the doctor some time afterwards, and he said he got a very excellent result, that he did not have any shortening, and the patient did not have any trouble.

The other case I saw within a year was a man who had been treated by a plaster cast in this city in one of our hospitals, and he had an angular deformity and a shortening of over two inches. It cost the doctor \$10,000.

Now then, this result of mine that I got these years ago was due to the fact that I did not pay enough daily atten-

tion to the traction apparatus. I believe that in fractures of the shaft of the femur one never needs to operate if one puts on enough traction and that traction is continuous. It must never let up. The treatment by the Thomas splint, which makes the traction with the splint, and without any outside apparatus, is of course an excellent way to do it. I do not believe that the majority of men will get good results with it, and I believe that in the country it requires too much attention to warrant its use. As a transport splint, of course, it is excellent, and in a properly organized hospital with properly trained assistants who know how to use it, it is all right. So we have used the Thomas splint, as I show you here, and we use it in a very simple way. Some of the results I will show you—and in explanation of those results I will simply say that until quite recently the treatment in our City Hospital was simple traction, so-called Buck's extension. There was difficulty in getting apparatus; there was difficulty about making people take hold. In spite of all those things, however, we got fairly good results.

Then the question of traction: I have had this man brought down to show how we use it. Now I believe that if the traction is continuous and never lets up, and the thigh is properly supported, that that is practically all there is to it. When I say that is all there is to it, I do not mean that you can get a perfect anatomical result, by any means; but you can get a good functional result. This splint is fastened to the foot of the bed, and the traction is made so that if the patient tends to come down and release his traction he comes against the rim of the splint; and the more he slides down the more traction he gets; and the more he slides up the more traction he gets. So he can never get away from it, and consequently the traction is continuous. That is the whole point, I think. Formerly when they were treated with other methods—Buck's extension and so on—the patient slid down in the bed and half the time there was not any traction; and that was the cause of the bad results, I believe. Now this, of course (indicating), can be lifted up and put anywhere you want it; you can raise this thing and put it up anywhere you like; and by having a board at the foot of the bed that can be held there.

Now that seems rather a rash statement to make, that that is sufficient for all fractures; but it is the only thing we use, and I think we get about the average results. I might say regarding the primary reduction of a fracture of the femur under an anesthetic, I do not believe that it is necessary and I believe that usually when you do reduce them and put on any kind of apparatus you like, unless you use traction, that the displacement has occurred before the patient is out of the anesthetic. So we simply apply this and put on traction and we get all the reduction we can.

There is just one point, however, about reduction, or rather I would say correction of position after reduction, and that is after a week or two weeks if you like, when the material around the end of the bones has become plastic and can be used as splints almost, that you can then correct the position if necessary and get a better result, that is, as to angulation. There will not be any angulation with traction if the traction is sufficient; but if, unfortu-

nately, for some reason or other, angulation has occurred, then I think it can be corrected.

Now this man here is a big, strong, muscular fellow. I have him here and I will have him walk in so you can see what his result is. This result will be what you see here anatomically, and the functional result will be what you see when you see him walk across the room. This man was not treated by me at first. For the last three or four years the resident at the hospital has been treating fractures of the femur, and he treated them under a good deal of difficulty, and he did very well, as you will see from some of these results. But every once in a while I would be called upon to see a man and I would find that his measurements were not very good; and I thought he was not going to have a good result, and then we would do something else. This is the position after he had been treated for three or four weeks. He was given an anesthetic and this position corrected some, as you see, pulled down a good deal more, and a good deal of weight put on; and this is the result.

Now it is a bad looking mess. Very early in the x-ray work I was associated with the late Dr. Wheaton, and I used to enthusiastically show him some x-ray pictures of fractures, and he would say, "Throw out your old x-ray pictures and show me the patient. I want to see the patient." So on two or three occasions where I was inclined to get anatomical perfection he would say, "That is good enough. You have a straight limb." I tried to correct it two or three times with his sanction, and I never improved it very much; but the patient got a good result. Later on, I might say, he became convinced of the value of x-ray pictures and said, "I don't see how I ever practiced surgery without them."

Just as in gross and histological pathology, we come to have a combined experience of clinical and radiographic evidence; and if we do not use both of those evidences, the clinical and the radiographic together, and take the sum of the result, we are going to get into trouble.

I might say—with whatever criticism it may bring—that I have never operated on a fracture of the femur. I have operated on some other fractures where the indications were quite apparent; but I have not operated on a fracture of the femur; and there is only one that I can think of where I wish I had.

This man here had a fracture of both femurs. He was a very obstreperous, sensitive fellow, and we had a great deal of difficulty in treating him. Now just as in that man in the picture I showed before, so in this man at the end of two or three weeks I anesthetized him, pulled it down and improved the position; and this slide shows what we finally got. We did not have any way of checking up the measurements because both were fractured. There is a difference of a little less than a centimeter between the two femurs, and he walks without any limp and perfectly well.

This woman was treated by the resident doctor, and I saw her repeatedly with him and was very much interested in the case. These are pictures taken at various times, showing the position of the fracture, and these are the final results. There is nothing more to say about that except that she was treated in this same traction. We will

have her walk in. (Woman walks across the stage.) This woman has been out of the hospital some four or five months. The first man has been out about six or eight months.

This is rather a remarkable series of pictures. That boy came in with a diagnosis of fracture of the femur, and there was something at once that was peculiar about it; I mean he gave a history of having had some disability and they thought his leg was broken before; and now he had broken it over again. So we took these pictures. This was the first picture. Now, of course, this shadow here and the rather porous condition of the bone and this sort of indefinite shadow out here attracted our attention at once, and we wondered. We put him on the same kind of traction that we have here, and this is the picture a little later, showing a great big arc of bone showing out here on each side, with the shaft of the femur in the center. This is a later picture, showing this bone having increased in density, and this shaft here acting as if it some time might be a sequestrum. In other words, the boy had a chronic osteomyelitis that he had been walking around with and paying no attention to until he fell and broke it, and then they put him to bed for a week or ten days; and as soon as the soreness got out of his leg he got up and walked around and broke it again; and this is the result here.

The interesting thing about this boy further was that after he had been in the hospital under treatment for about a month with traction, he suddenly developed a swollen elbow and had a good deal of pain and a good deal of fever. I will have the boy walk across the room so you can see him. (Boy walks across the stage.) He has been out of the hospital now for two or three months, and he is walking on that kind of femur; that is, he has osteomyelitis. He hadn't any elevation of temperature until the complication of the elbow arose. After this elevation of temperature and swollen elbow had existed for a week or so, I decided that he had an osteomyelitis at the lower end of the humerus, and simply incised the abscess down to the bone and drained it.

The extraordinary thing about this femur is that he has osteomyelitis. He has had it for many months. He had a fracture and it has united; there has been enough plastic material thrown out. You see it has never discharged; it hasn't any opening. The bone is not very tender; his thigh is perfectly straight. You can see that osteomyelitis at the lower end of the humerus with simple drainage, without any attack on the bone at all, has been cured. This young bone has acted very much like soft parts and has drained itself, and the elbow is apparently perfect. The bone, of course, is the most prolific tissue in the body. I think the osteoblasts do more for repair than any of the other tissues we have. The repair of children's fractures is unusually rapid. The amount of new bone thrown out—it is thrown out very quickly—the bone, by virtue of the static demands and the growing under those static demands, acquires its shape, even if there is primary deformity. If there is not too much angulation they will in time correct that, not only in the femur and tibia, but in the arm bones as well. I have watched them for years—some of them where there was a very great deal of displacement—and they are corrected.

It seems to me that these pictures show pretty positively that operative treatment in fractures of the femur is rarely called for. That first man was a great big strong fellow, and so was the man in the pictures of the second case you saw that were treated by this simple method of traction. The traction is continuous, and the limb is in such a position that you can inspect it at any time you want to. It must be measured frequently. If that is done I have come to think that fracture of the femur, in the shaft at least—and Dr. Meyerding and Dr. Cole and Dr. Reed have all emphasized the value of the abduction treatment in fractures of the neck—I think it is pretty unanimously agreed that this is the treatment for most cases. It seems to me that the cases that have to be operated on are very rare, indeed.

Now, just one minute about the hospitalization. This very valuable article of Dr. Speed's to which I referred, says that fractures of the femur are all subject to hospitalization and they should be treated in the hospital and they should be treated by radiography control. Well, that is very fine, and it is the most desirable thing to do. I feel that the radiograph in its connection with fractures is one of the most valuable things we have in the sense of studying fractures, just as the microscope is a very valuable thing to study tumors. After you have studied them for a long time, you get to know them. So with the study of fractures with the radiograph. The combined radiograph and clinical study—and the clinical study must not let up one minute during the time that you are interested in the radiograph, because if you do you will get into trouble. But with that combined study it is fine.

I believe, however, that in most fractures of the femur, and I think it should be recognized as true, because a very large number of fractures have to be treated in the country; they are not near a hospital, it is difficult to move them—I think they can be treated perfectly well if they are treated with the very simple arrangements which we use with the Thomas splint, which makes it impossible for the traction to let up, and if instead of using the radiographic control you will use the clinical control to watch your apparatus and make the measurements every few days, I think you are bound to get a pretty good result.

Dr. A. E. WILCOX, Minneapolis: These very interesting papers heard this morning emphasize the importance of, and are evidence that, we are beginning to appreciate that the treatment of fractures is a difficult department of surgery.

While I was listening to Dr. Colvin, I was reminded of a case which we are now observing. The patient is suffering from a fracture of both thighs, simple in type, and, although she is in a hospital where available equipment is efficient, in fact, apparatus which I am particularly partial to and think I know how to apply, we are having a great many difficulties. We are experiencing a problem, the solving of which necessitates the management of a delirious patient, resulting from fracture of the skull, complicating the fractured thighs. We are having local abscess from broken down hematomas of the soft structures, and all the while we are trying to keep proper extension on the thighs by caliper skeletal traction. It is not difficult to visualize the problem, or to appreciate the problem.

In the treatment of fractures there are three fundamental

principles which have been emphasized in all the papers read today. They are: First, selection of the type of treatment, according to the type of case, age of patient, etc.; second, the general principle of extension and counter extension, and third, forms and methods of mechanical apparatus for holding reduced fragments in place after reduction has been attained. By keeping these fundamental principles in mind we stand a good chance of obtaining the result desired, namely, a good functional result, and if not an entirely satisfactory result an anatomical one.

The subject of the treatment of fractures of the thigh could be discussed indefinitely. I, therefore, prefer at this time to adhere to a discussion of the three fundamental principles mentioned.

In the General Hospital, Minneapolis, upon admission of a fracture case, we attempt to classify same, operative or non-operative. We consider skeletal traction, in any form, operative, and so classify such cases for the reason that the procedure must be carried out under the same conditions and with the same technique as that exhibited in more formal procedures. After classification, and the treatment selected, the next thought is extension and counter-extension. In fact, extension is thought from the time the patient is seen by our house-officers at the scene of accident, at which time, in cases of fracture of the thigh, a Thomas splint, which is carried in the ambulance, is at once applied and the patient reaches the hospital with the leg under the influence of extension.

Following application of more refined extension and counter-extension with our standardized splints we come to an important part of the treatment. We may be very much satisfied with our efforts up to this time. Reduction is good, patient comfortable and apparatus well applied, but from this time on the importance of daily observation and adjustment of the apparatus cannot be overestimated. Calipers must be watched, the wounds kept clean, supportive toweling smooth and on the right tension, and the position of the fragments checked and rechecked repeatedly with portable x-rays.

One must have the intelligent co-operation of the house staff and considerable enthusiasm amongst the associates. In fact, the concerted effort of every one coming in contact with such cases is necessary to obtain the best results. Without this co-operation, unless one has the time to do all adjustment themselves, you are going to find, sooner or later, that deformity has occurred, just as Dr. Colvin has stated, which may require repeated anesthesia and correction. Therefore, I think the post-traumatic period, after classification, reduction and fixation, is a very important period as regards treatment. Observation during this period must be most conscientious, diligent and continuous, for even where there is internal fixation by steel plate application, the strong muscles are everlastingly contracting and produce secondary deformity unless continuous extension is applied long enough to attain callus formation.

Another point in all fractures of the thigh is the question of when to allow weight bearing. Assuming good alignment, good callus formation and functional joints, weight bearing must be deferred until the callus is hard. It is our custom to urge these cases to use caliper walking splints, depending upon their weight, activity and amount

of callus, for three to six months after union has occurred. I am particular to see that the patients co-operate with these suggestions and use the splint continually. Under these conditions children may soon return to school, or adults return to certain types of employment without danger of secondary deformity or bowing. One such secondary deformity in a limb which was not protected, although in perfect condition when discharged, was sufficient to teach me this lesson.

The question of treatment of thigh fracture is very important, as Dr. Meyerding says, for the responsibility of the surgeon in these cases is very great. He is responsible not only for good functional results, but patients expect good anatomical results as well.

I do not quite agree with Dr. Colvin when he states that all cases of fracture of the thigh can be treated satisfactorily by extension alone. I have a number of cases in which I am fully convinced I have obtained much better results by operating upon them than I would have had by using extension only in the treatment, and at the present time, from these experiences, I am satisfied that operation in selected cases at times is clearly indicated.

Another thing—our responsibility in court is such that the presentation of some of the x-rays such as Dr. Colvin has shown this morning, if exhibited by a less famous surgeon, would be apt to bring from a jury, even where the functional result has been so good, a large verdict. A famous man can get away with such types of cases by emphasizing the importance of functional results, but the jury, where they are allowed to view x-rays of this type, would certainly be doubtful about the efficiency of the treatment. Until we educate the people to the fact that functional results are the thing to be obtained and that frequently it is impossible to secure good anatomical alignment, as shown in x-rays, we are going to run the chances of having verdicts against us in the courts.

DR. E. K. GREEN, Minneapolis: I want to emphasize one or two points which were brought out. Dr. Wilcox, I think, has made one of the most important points here this morning and that is in regard to our being everlastingly on the job. These cases are not easy; they are major cases, and it is very necessary that they should be looked after continuously.

There is one point with regard to the matter of extension which I would like to bring out here, and that is the amount of the weight. I do not know what the experience of other surgeons has been, but I have found this to be true, that a fracture of the femur will be put up with 20 pounds weight, and the surgeon will keep it on faithfully for say three months, or less—whatever time he thinks is necessary—having never changed the weight, making it more or less, and having paid very little attention as to what it is doing. It seems to me that that is altogether wrong. When you take one of these fractures into the hospital to reduce and try to pull it out—did you ever think how much weight you put onto it? Sometimes to get it out where you want it, you put on all the strength you have and maybe get somebody else to help you. So, consequently, it seems to me that there are many times where we can put on a very much greater weight than has been suggested here this morning. I think 30 pounds is the largest that I have

heard. I would say up to 50 or 75 pounds; but when I say that, just be careful! If you do not know when is the right time to take off the weight you are going to get into more trouble than you would if you did not put it on. That is what you have to look out for. Consequently, the question of watching the patient and knowing what to do at the right time is probably the most important part of the management.

There is just one other point that I want to emphasize. It was brought out by Dr. Reed. There is no time in the operating of a fracture that I feel so scared and really do not know what to do and how to do it and do it right as the matter of getting the patient back to the room and into his bed after I have operated him. Many times you will see a doctor operate the case, and then turn it over to the internes or to inexperienced nurses. I think the doctor should stay by his case absolutely until he sees that they are properly placed in bed, especially after operations.

DR. ROBERT EARL, St. Paul: I believe one of the most common faults in treating fractures of the femur with external traction is that the adhesive is not run far enough up on the thigh. Many men think that you should not put the adhesive any higher than the fracture. Some even stop it below the knee.

In surface traction the adhesive should be applied well above the point of the fracture, as high up on the groin and hip as possible, even if the fracture is in the lower part of the femur. In a fracture the lower end will be carried down by traction, the upper end being fixed. That the soft parts can be stretched and carried down below the proximal end of the fractured bone has been demonstrated in cases of amputation of the thigh in which the bone has been cut too long so the amputated end of the femur is exposed as much as two or three inches. In these cases, surface traction will pull the soft tissues down so they will unite over the end of the protruding amputated femur, demonstrating that surface traction can elongate the soft tissues.

Surgeons with very large experience, who have used as high as 50 pounds of weight, have never seen any damage done to the knee-joint by properly applied surface traction. The application of adhesive high up on the thigh, even when the fracture is in the lower third, relieves the knee of much strain.

When an anesthetic is given, the muscles should be over-stretched so as to partly paralyze them, after which not nearly so much traction will be required to maintain the desired length. If an anesthetic is not given, maximum traction should be used at the beginning when the ligaments are firm, as there is then less danger of producing relaxed joints than if gradually increasing traction is applied after the ligaments are softened.

Maximum traction at the beginning decreases the pain and gives better alignment before the blood clot at the site of fracture becomes organized.

DR. A. E. BENJAMIN, Minneapolis: There are one or two points that I think we should emphasize. The man who treats these cases, especially the general practitioner who takes them as emergency cases, does not need to be discouraged if the first x-ray does not show the proper

position. If you wait two or three weeks when the exudation is plastic, reduction can be made and the fragments retained more readily than at the primary reduction. That has been demonstrated in some cases I have had.

In regard to the operative procedure, I have found that there are certain classes of cases in fracture of the femur where the time saved in recovery of the patient pays one to operate; that is, if it is done with proper precautions and in the hospital. I think that when bone surgery first came out we were misled a little in the operative procedure; as were some who visited Lane and saw him operate in his small operating room where he could not turn around without a possibility of touching some of the instruments or the wound. The method which he employed interested many American surgeons. If a man is careful in selecting and operating his cases in bone surgery, he will get just as good results as in a laparotomy. There isn't any question about it. The bones and all the tissues heal as a rule. If he is rough and traumatizes the tissues and does not have them well protected—as I have seen some operators do—he will infect the wound. He may have four or five assistants pulling and tugging in order to get reduction and the bone in place and the plate on. If you are very careful to supervise the work at the time, I think you will get very good results; at least I have had in nearly all of my cases that I have operated upon.

Oblique fractures—particularly where they will not stay in place; the x-ray will show each time that they have slid some; no matter how much traction you put on. Such cases particularly are applicable for operative procedure.

DR. ARNOLD SCHWYZER, St. Paul: I believe that operations on fractures of the thigh are very seldom necessary. Some of the men who have discussed this have said that there were certain cases that they want to operate on. I would like to ask all of these men who have operated, what percentage of infection they get, and after they get it, what results do they have? Now these cases of Dr. Colvin's and these people who have gone across the stage here have had as perfect a result from a fracture of this kind as you could expect. I think it is, therefore, rather begging the question; and it is up to us to defend the men who are brought into court for malpractice. We should make it a professional, ethical question that if we have a doctor brought into court and his patient can go across the court room as these people have done, it is up to us to defend that man and say you absolutely can't get any better result. There are a certain number of doctors who would say if this patient were operated upon you would have a good anatomical result. Let them say how many times they have operated upon cases of this kind, and what percentage of results have been bad.

Now I have been all through this period of operating upon fractures of the femur. I have done some myself; I have seen a good many; and I know that the percentage of bad results is large. There are possibly in the very lowest part of the femur, where you would have a fracture into the knee joint, then I can see, in order to preserve the function of the knee joint, that it might be necessary to operate and put the two pieces together so that you would have a good functional result in the joint. But I think from this clinic that we have had from Dr. Colvin, that it shows us that

these fractures can be treated so that you will get a good functional result.

We must defend each other. A jury of laymen look at those pictures and say, "That isn't right." It is right, and we have to defend it. I have had people brought in to me with fractures of the two bones of the wrist, with an absolutely perfect functional result—could do anything; and they would say, "Well, here is the plate, and it is bad. The bones are not in place." I say, "What do you want? Suppose you do open it and you get rigidity of the tendons? The patient may go away with a perfect anatomical result, with a very poor functional result."

DR. H. B. SWEETSER, Minneapolis: I believe that open operations on fractures of the femur are very seldom necessary. Some of the men who have taken part in this discussion have indicated that they operate on a fair percentage of their cases. Now I would like to ask them what percentage of infection they get, and, when infection occurs, what is the final result? From my own experience and from my knowledge of the post-operative results of some other surgeons, who are skillful and careful surgeons, I suspect the percentage of infection is high, and the functional results following infection are bad, and may be fatal. Treatment without operation, whatever else may happen, at least is almost never complicated by infection.

These cases of Dr. Colvin's ought to and do carry to us a very graphic lesson. We look at his pictures and we say the anatomical results are poor and some of them bad. He then shows us the patients from whom these pictures were taken and gets them to walk across the stage, and we find that functionally the results are perfect,—no limp and normal movements. It has been said here that Dr. Colvin *might* get by, but that a man of lesser reputation would surely be mulcted for damages by a lay jury if such pictures were exhibited in court. I say that such a verdict ought to be impossible, no matter what the x-ray pictures show, if the patient can walk across the court room as these patients of Dr. Colvin's have walked across the stage here. We are looking for good functional results, and we should make it a professional, ethical question to defend any doctor, no matter how obscure his status, if his functional result is good, irrespective of what the x-ray shows.

I do not deny that there are some fractures of the femur in which an open operation may be necessary, and this is especially true of fractures which extend into the knee-joint, in order to restore even joint surfaces, but I think this clinic which Dr. Colvin has given us surely proves that the number of such cases must be small.

DR. H. W. MEYERDING, Rochester: It is very gratifying to me to find that the members of this symposium agree as well as they do upon the treatment of fractures of the femur. I do not recall hearing anyone advocate very strongly open treatment of fractures of the femur as a routine. We are all agreed that recent fractures of the hip are treated best by the Whitman closed method. We are not discussing malunion, nonunion or delayed union or osteomyelitis following infection. We seem to be agreed that the Thomas extension splint, as shown by Dr. Colvin, with certain modifications as used in various clinics, is the best means of treating fractures of the femur.

There are points in my paper which I did not get to,

such as of the articular fractures and epiphyseal separation. The question of joint incongruity and permanent partial disability comes up frequently following intra-articular fractures of the femur with displacement. We could discuss fracture all day and I am sure bring out new points constantly; however, there is not sufficient time.

I think lateral traction is very valuable where we have displacements such as some of the rays presented this morning showed. Five or ten pounds overhead traction or lateral traction often will help reduce and improve the position. Tight splinting, however, should be avoided; and the use of lateral splints, as formerly were so commonly used, led to needless atrophy and interference of circulation.

DR. C. A. REED, Minneapolis: Just a word in regard to these bad anatomical results and good functional results as shown by Dr. Colvin. I think we have all had that experience, and we will continue to have them; but some of our worst anatomical results will come out with pretty good functional results. I would like to ask if after a year or two these people could return to their original occupation, whether they had the full range of motion in the knee, and such things. But simply to repeat the findings of the British Medical Association Committee that while you might get brilliant functional results with an indifferent anatomical one—the surest way to get a good functional result is with a good anatomical one. I am sure that any of us could show pictures of better anatomical results and very much worse functional results. That is the type of case that we must try to avoid. It is not just a question of whether we have a few cases; the large statistics show that in good hospital practice the functional result is not good enough so that a very large proportion can go back to arduous labor.

DR. ALEX COLVIN, St. Paul: This is the man who had the double fracture of the femur; and we showed the rather awkward position of the fragments. He came in late be-

cause his machine broke down and he could not get here before. But he was very anxious to show what good legs he had. He whispered to me just now, when Dr. Reed said that he would like to see him a year from now, "Here is a year from now!"

I have accused myself a good many times of being a procrastinator and of not being progressive enough about fractures; and I will confess that occasionally I have missed an operation that I think I might have done. But I look upon an open operation for fracture of the femur as one of the biggest operations in surgery, and one of the most difficult to do, and one of the most difficult to get a result from after you have operated. It is a dangerous operation. People have lost their lives from it. They do not lose their lives from this kind of treatment. They do get functional results.

I think it is just as big a scientific accomplishment to treat a fracture non-operatively as by operation. Indeed, it is more scientific. There are just as many scientific principles involved in the proper treatment of fracture by mechanical methods as there are in operating upon them—even more. And I would say this, that I do not think any man is justified in operating on a fracture of the femur until he has proven to himself by sufficient experience that he cannot get a result by the ordinary mechanical methods; and I think there are very few men—at least comparatively few men; I am not speaking of men in the cities with big surgical practices, who get cases sent to them from all over—but there are very few men who through the country do some surgery and bone emergency surgery and all that sort of thing—there are very few men who have the experience which enables them to say to themselves, "I know that I can't get a result any other way." The only time I will operate on any fracture is where I can convince myself that "You can't get a result any other way; you have to operate." And there was not one fracture there that I felt I could convince myself sufficiently to say that.

"CHIROPRACTORS CLAIM RIGHT TO PRACTICE IN THE CITY HOSPITALS"

Under this caption the Jamestown Journal of February 7 gives a detailed account of a hearing before the city board of public welfare at which several chiropractors demanded the right to send patients to the city hospital and to treat any already there and desiring chiropractic treatment. "For two hours," says the Journal, "the 'back breakers' argued with members of the board and health officials, finally leaving when they were assured that the board will seek legal advice on the possibilities of allowing the hospital to be used for chiropractic treatments."

It is easy enough to understand the apparent lack of a sense of the fitness of things which prompted the chiro-

practors to present their demands thus openly, but not so easy to understand how they could hold the attention of an official board for two hours.

According to Mr. George W. Whiteside, counsel of the State Medical Society, there is no question but that chiropractors who practice what they are accustomed to call their "profession" are doing so in violation of the law of the State. "Chiropractic," he says, "is scientifically unsound and should be fought as a plague—its practice here is a crime which no political expediency can condone."

Assuming the correctness of this opinion, to permit them to practice in a public institution would be making the institution an instrument in the violation of the laws of the state.—*Health News, New York State Department of Health, March 3, 1924.*

SOME NOTES ON THE TREATMENT OF
TUBERCULOSIS *A. T. LAIRD, M.D.
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The successful treatment of tuberculosis depends on several factors. First of all the type of case must be considered, as results are possible for some patients that are not for others. The germ may have fallen in more or less refractory soil. A careful study of the history will show whether the patient comes from a "tuberculized" strain or a susceptible one; whether he has gradually become somewhat immunized himself; whether his surroundings and experiences have increased or diminished his resistance to infection; whether he has the mental and moral stamina to fight his enemy intelligently.

The duration of the infection and the degree of activity it has reached also affect the prognosis. Ordinarily it will be a simpler matter to secure satisfactory results in an early than in an advanced case. Frequently, however, a case diagnosed early will be found to come of non-resistant stock and run a rapid course. On the other hand, a moderately advanced case which has not been given a fair chance may do wonderfully well if placed under proper conditions.

Every effort should be made to secure earlier diagnosis through the study of contacts in infected families and by the fuller use of the diagnostic resources of general hospitals, every one of which should have open air wards where cases can be adequately treated while being studied. Routine physical examination of workers in industrial plants and the wider use of periodic physical examinations among apparently well people will doubtless bring to light many unsuspected cases.

In treatment various agencies and measures will be needed. The supervision of a case may have to extend several years and involve the use of a score of measures and agencies. Many of these will not be available in a practicing physician's office or in the patient's home. Usually it will be advisable for the patient to be in a sanatorium during some part of the treatment. The treatment may be outlined as follows:

TREATMENT OF TUBERCULOSIS

I. Active Stages:

A. General Measures.

1. Rest.
2. Open air.
3. Proper feeding.
4. Psychotherapy.
5. Supervision.
6. Correction of defects.
7. Careful nursing.
8. Symptoms.
9. Special treatment (Heliotherapy).
10. Specific treatment (Tuberculin).
11. Climatic treatment.

B. Local Measures.

1. Pulmonary Tuberculosis.
 - a. Control of cough.
 - b. Treatment of hemorrhage.
 - c. Treatment of pleurisy and pleural effusion.
 - d. Pneumothorax.
 - e. Thoracic surgery.
2. Laryngeal Tuberculosis.
 - a. Heliotherapy — general; local.
 - b. Local applications—sprays; direct applications.
 - c. Nerve injection.
3. Bone and Joint Disease.
 - a. Heliotherapy and light treatment.
 - b. Orthopedic measures and surgery.
 - c. Tuberculin.
4. Gland Tuberculosis.
 - a. Heliotherapy.
 - b. Tuberculin.
 - c. X-ray.
 - d. Surgery.
5. Other forms of tuberculosis.

II. Quiescent Stage:

1. Regulated rest and exercise.
2. Training in hygienic living.
3. Occupational therapy.

III. Apparently Arrested Stage:

1. Regulated rest and exercise.
2. Vocational conferences.
3. Study and supervised work.
4. Training in living with a handicap.

*Read before the Hennepin County Medical Society, Sept. 26, 1923.

IV. Arrested Stage:

1. Adequate follow-up.
2. Sheltered employment.
3. Gradual return to active citizenship.

1. *Rest* is our most powerful resource in fighting active tuberculosis as well as the best symptomatic treatment for hemorrhages, night sweats and cough. Dr. Peter Dettweiler, Brehmer's pupil and patient, was the first to utilize this resource fully and systematically. Dr. Joseph Pratt of Boston and Dr. Hugh M. Kinghorn of Saranac Lake have been particularly strict in its application. Dr. Marcus Paterson of Frimley Sanatorium in England has advocated the earlier and more strenuous use of exercise. During the activity of the disease there can be no doubt of the value of complete and prolonged rest.

2. *Open Air* has no direct action on the tubercle bacillus and is only one of many measures for increasing bodily resistance to the invading germs. Yet it is one of the very best. George Bodington of Sutton-Coldfield, Warwickshire, England, was one of the first to advocate its use, establishing a fresh air institution for the treatment of consumptives in 1840. His theories, however, did not gain much approval and Brehmer may be said to be the real founder of the modern fresh air treatment, applying it on a large scale in his sanatorium at Goerbersdorf, in Germany, about 1859. Its full application requires special equipment and technique, sheltered and screened porches, beds with easy running wheel castors, special methods of bed making, warm clothes for those who sit out of doors, etc. If these are at hand there are very few days in the year in temperate climates when outdoor life cannot be enjoyed. Automobilists find it possible to be comfortable out of doors, even in open cars, with the help of fur coats, foot warmers, etc., and patients should have all necessary equipment for outdoor living. Usually, especially for those who have lived indoors, there results a general improvement in nutrition, appetite, digestion, and sleep. Cough and fever are lessened.

3. *Proper Feeding*.—Various fads in the feeding of tuberculosis patients, such as overfeeding and high protein diet, have mostly passed out of fashion. A generous mixed diet, one that the patient can assimilate, is now considered the reasonable one. Special dietetic management will be needed in individual cases. In febrile cases it

should be simple. Milk alone may be used to advantage at times.

4. *Psychotherapy*.—The securing of the correct mental attitude on the part of the patient is usually the result of the co-operation of physicians, nurses and properly instructed relatives and friends. A patient may easily be over visited and over consulted on family affairs. His porch-mates may be too ready to discuss their symptoms at all times with him and such conversations should be discouraged. The stunned, panic stricken phase in which alarm is predominant should under favorable auspices give place to a calm facing of facts and realization of how large a portion of what makes life worth living can be salvaged. As soon as a man makes peace with his fate and faces it unafraid he has the mental attitude that helps recovery. Social service may relieve a man of worries about his family. Diversional craft work will show him that he can still interest himself in worth while accomplishment and get results. It will help him to stop brooding over his disease and to quit "practicing on a harp" as one of my patients said. Another mistake that patients often make is postponing interest in life until recovery, missing the enjoyment which is entirely possible to people who feel well and are given an enforced vacation in beautiful surroundings.

5. *Medical Supervision*.—The fact that the patient must develop habits of healthful living and that these must be drilled into him by precept and encouraging counsel makes continuous medical supervision most necessary especially in the active stages of the disease. This is one reason why the private physician, if he is unwilling to undertake the constant supervision of the patient himself, should not advise him or permit him to do without supervision, for instance "to go to a farm where there are plenty of good fresh eggs and milk as well as fresh air," but should rather refer him to a competent specialist or sanatorium for medical guidance.

6. *Correction of Defects*.—Frequently pathological conditions in the teeth, tonsils, pelvis, appendix or other organs obscure the symptomatology of the case and hinder recovery. Whenever possible these should be corrected early in the treatment of the case provided the operation itself does not do more harm than good. Ether anesthesia, especially if of long duration, is probably justly

held responsible for the lighting up of many latent tuberculous infections. Local anesthesia would be the preferable method in most cases.

7. *Careful Nursing.*—A skillful nurse trained in the technique of outdoor treatment and the rest cure can often turn the scale in the patient's favor, especially in the active stage of the disease. As tuberculosis is a common disease every nurse should be familiar with its care and a two or three months' course in the actual care of tuberculous patients in an affiliated sanatorium should be part of the curriculum of every nurses' training school.

8. *Symptomatic Treatment.* — Medicines of various kinds are needed now and then in most cases. Laxatives and astringents, expectorants and sedatives, hypnotics and alteratives all have their place. The routine use of laxatives can often be avoided by diet. Counterirritants and other local applications relieve pain. Opiates and other narcotics should be used with extreme care in the early stages of the disease on account of the danger of habit formation. In far advanced cases they can be used more freely. Palliative measures of various kinds can give a great deal of relief and comfort.

9. *Of Special Treatments* now in vogue, heliotherapy appears to be by far the most useful. However, it is not generally considered applicable to pulmonary cases. In bone and joint tuberculosis it has a most helpful influence on the general metabolism as well as upon the local lesion.

10. *Specific Treatment.*—The only specific treatment which is generally believed to have any value is the tuberculin treatment and this like heliotherapy is more useful in surgical and gland tuberculosis than in pulmonary disease. The method of Trudeau is the one generally approved in administering it.

11. *Climatic Treatment.*—Health resorts located in widely differing climates have been praised as suitable for tuberculous patients. The good reputation of some of them has been due to the excellent systems of treatment followed in them. Practically no climate is ideal throughout the year, and nearly every climate is good during a portion of the year. Northern Minnesota has a climate in many respects similar to that of the Adirondacks. Rest, peace of mind, good care, and proper food are obtainable near the patient's home. Home-

sickness and worry about finances are more common in distant health resorts. Leaving the home climate is usually attended with some risk and requires abundant financial resources.

The detail of local treatment need not be discussed at this time as we are making only a brief discussion of general principles.

Treatment in the Quiescent Stage.—While the patient is still at the sanatorium he may lose all essential symptoms and feel perfectly well. If this condition lasts two months his lesion is said to be "quiescent" according to the definition of the National Tuberculosis Association. Tubercle bacilli may or may not be present in his sputum. At this period the "administration" of exercise in gradually increasing doses is begun. The effect is to be judged by a careful study of the patient's condition at very short intervals. Records of temperature and pulse must be kept and the occurrence of unfavorable symptoms must be noted. The weight must be closely watched. In many cases the record may be kept by the patient provided his intelligent interest and co-operation are enlisted. Most sanatorium men do not try to secure definite auto-inoculation reactions by exercise after the method of Paterson. Some such plan of gradual increase as the following is usually employed.

EXERCISE ALLOWED IN DIFFERENT GRADES

1. Complete rest in bed.
- 1A. Rest in bed. Turning on side permitted.
2. Rest in bed. Patient allowed to turn on side and to sit up occasionally.
- 2A. Rest in bed. May use commode or go to bath room in wheel chair. Letter writing and reading by special permission.
3. Rest in bed. May walk to bath room. Reading and letter writing permitted. Light fancy work and light handicrafts allowed after special permission for not over one hour a day.
- 3A. Meals in small dining room. Other exercises as in preceding grades.
4. Meals in main dining room. Patient to return to room immediately after the meal.
- 4A. Reception room exercise. Short auto rides permitted, not over one-half hour. Attendance at entertainments allowed. Patient may remain downstairs after meals.

5. Fifteen minutes walking, besides exercise specified in second column. May spend evening in reception room, may attend entertainments and take exercise of preceding grades.
- 5A. Thirty minutes walking, besides exercise specified in second column. May take exercise of preceding grades. All handicraft work to be done in workshop. Permission to be secured for as much as two hours light work in all if done while sitting.
6. Forty-five minutes walking. Other exercises as in preceding grades.
- 6A. One hour walking. Other exercises as in preceding grades.
7. One and one-half hours exercise. Not over one hour walking. May work in office or do other light work up to three hours upon special permission. May take school work. Vocational training.
- 7A. Two hours exercise. Not over one hour of walking. May take exercise of preceding grades. Not over two hours of active exercise. May have up to four hours of light work or school work. Vocational training.
8. Three hours exercise. May be all work or part work. Not over one hour of walking to be included without special permission. Vocational training.
- 8A. Four hours exercise. Four hours light work or other exercise including walking. Vocational training.
9. Five hours exercise. Five hours work and other exercise including walking. Vocational training.
- 9A. Six hours exercise. Six hours work and other exercise including walking. Vocational training.
10. Seven hours exercise. Seven hours work and other exercise including walking. Vocational training.
- 10A. Eight hours exercise. Eight hours work and other exercises including walking. Vocational training.

Apparently Arrested Stage.—In the "apparently arrested" stage according to the National Association definition, symptoms must have been absent for a period of three months and tubercle bacilli must have disappeared from the sputum.

Having reached this stage in the return to health, the patient should make definite life plans and have special counsel in adjusting himself to a new kind of living. Those accustomed to heavy manual labor must in most instances choose a new vocation. Even very modest attainment in the study of English and in figuring may make it possible for a man to secure a position as supervising foreman or time keeper. For those who already have some education the state through its care for the handicapped offers special opportunities for instruction.

The actual performance of a certain amount of work at the sanatorium without relapse is the best guarantee that the patient can safely go home to less sheltered employment. The industrial colony at Papworth, in England, which operates in close association with a sanatorium, offers opportunities for intra-mural employment on a larger scale than any American institution, although most sanatoria have a few arrested cases among their employees.

Arrested Stage.—In the arrested stage, according to the National Association's definition, symptoms and bacilli must have been absent for a period of six months. In most instances the patient will have left the sanatorium and be back facing the world again. Unless closely followed up he may return to the exact environment and working conditions that caused his downfall in the first place. He needs the counsel and encouragement of a physician familiar with his special problem and his work must be within his limited capacity. Often the way the hours are spent when he is not working determines his fate. An indoor occupation may be more suitable than an outdoor one that requires much muscular exertion. Working indoors a limited number of hours and sleeping out gives the patient as much fresh air as working out of doors and sleeping in.

As stated in the beginning of the paper many of the agencies which must be used in the treatment of tuberculosis are not within the control of any physician, yet at some time during the course of the treatment of nearly every case the private physician will have to shoulder considerable responsibility. He must ordinarily make the diagnosis and has at his call the resources of the general hospital. He should have the privilege of having his patient at the hospital and the hospital should provide suitable treatment for his patient while there.

The sanatorium has a definite place in the mechanism for securing the best results for his patient and the physician assumes a heavy responsibility who does not advise sanatorium treatment at the proper time. The modern sanatorium offers the patient the following advantages:

- Conveniences for "cure taking"
- Freedom from responsibility
- Constant medical guidance
- The moral support of other patients taking the same treatment
- Rest hours free from disturbance
- Nursing care always available
- Training in the protection of others from infection.

After a course of training at a sanatorium, home treatment is more likely to be successful than if attempted first. There is no reason, however, for sending moribund patients long distances to a sanatorium. They should be cared for at home or in a local hospital.

The responsibility for the medical follow-up of cases discharged from sanatoriums must rest largely with the private physician. The state will doubtless do much more than it has in affording him the counsel and active assistance of members of the sanatorium staff. This service can be furnished the physician along with free sputum examinations and other diagnostic facilities. To secure permanent results there must be active co-operation between the physician and the sanatorium. The physician must be familiar with the special form of home treatment required, and for this purpose the general hospital must provide him actual experience and training.

The sanatorium needs the skill of the hospital staff in the treatment of surgical complications and special conditions.

The treatment of a case of tuberculosis may last many years. The patient may promptly get well or die; on the other hand, he may neither get well nor die and for a series of years may be a decidedly handicapped citizen. That he have the maximum degree of health possible and be as much of an asset to the community as his health will permit requires the co-ordinated work of physicians and sanatoria as well as of other agencies. The State Advisory Commission is directing the work in Minnesota and should have the cordial co-operation of every physician and every institution.

OSTEOCHONDROMATOSIS OF THE HIP JOINT*

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Osteochondromatosis is a rare pathologic condition of the synovial membrane found in certain joints, bursæ and tendon sheaths, in which the stratum synoviale takes on the property of forming osteocartilaginous bodies. The recent work of Jones in which he thoroughly searched the literature and studied the twenty cases that had been observed in the Mayo Clinic until November, 1923, gives further weight to the theory that the condition should be classified as a benign neoplastic process. Since the completion of this study, a patient has come under our observation with the condition in the hip joint. This is the only patient in our series whose hip joint is involved, and we have been able to find only one mentioned in the literature, that by Eden, in 1914.†

ETIOLOGY

Various etiologic hypotheses have been advanced; these may be grouped as infectious, traumatic, embryologic, and neoplastic. Most writers have been inclined to place little value on infection as an etiologic factor. Some of them, however, lean toward the infectious theory (Bolton, Halstead, Reichel and Hahn). Jones, after reviewing the literature and our cases, concluded that infection did not play a part of any consequence in the etiology. Trauma has been stressed by certain writers (Humphry, Davis, Carothers, Henderson, and Fisher) as an etiologic factor, and Jones, in reviewing our records, found a definite history of trauma, usually long before finding the loose bodies, present in eight.

The fact that all the tissues involved in this process are developed by differentiation of the same mesenchymal tissue is emphasized by Whitelocke, Lotsch, Henderson and Fisher. During development in the embryo, some of these cells degenerate to form the joint cavity, some differentiate to form the joint cartilage, and some to form the synovial membrane. This embryologic theory is closely al-

*Read before the Minnesota Academy of Medicine, St. Paul, February 13, 1924.

†In the interval between sending this article in for publication and receiving the proof, we have operated on another patient with loose bodies in the hip, and removed twenty-seven bodies, fourteen attached by pedicles and thirteen free. A posterior incision was used.

lied to the neoplastic, and it is necessary to accept this basis before the latter is discussed. Ziegler defines a neoplasm as "a new formation of tissue, apparently arising and growing independently, having an atypical structure inserted uselessly into the organism, possessing no function of service to the body, and showing no typical termination of growth." Osteochondromatosis grows slowly, is expansive rather than infiltrating, mitotic figures are absent, it is encapsulated, never metastasizes, does not tend to recur after removal, and is composed of well differentiated cells. These findings are characteristic of benign neoplasms, and therefore it is logical to classify osteochondromatosis with this group.

PATHOLOGY

Joint capsules are composed of two layers, a stratum fibrosum and a stratum synoviale, the former characterized by dense connective tissue, the latter by loose connective tissue containing fat, blood vessels and lymphatics. The stratum synoviale has an inner smooth lining, composed of parallel fibers of connective tissue and round or stellate cells with large nuclei. In areas of unusual pressure these cells with the large nuclei are infrequent, in others they are arranged in a single layer, whereas, especially in the crypts and pockets and margins of the joint, this mesothelium may be three or four cells in thickness (Lewis and Stöhr). Laennec, Rokitsky and Brodie thought that the bodies might arise from either layer, but Kölliker and Eden believed that they came from the stratum synoviale. Jones, from his study, concluded that the bodies arose from the stratum synoviale. Müller, Hagemann, Kienböck and Henderson mention that the point of origin frequently is at the juncture of the joint capsule with the periosteum, where the mesothelial cells are in greater number. However, there is no doubt but that any portion of the synovial membrane may be the site of the bodies. They may start either as osteomas or chondromas. The cartilage may be hyalin, fibrous, calcified, or a combination of these forms. Bone in these bodies may be developed either directly from connective tissue by the membrane method, or by preformation in the cartilage. The most typical form is a spherical shell of bone surrounded by cartilage and fibrous tissue, and filled with vascular fat and spurs of bone. The bodies are at first attached by pedicles, through which they get their blood supply. Due to their becoming larger and heavier, and the nat-

ural trauma associated with joint motion, they finally break their pedicles and wander as free loose bodies. The question as to whether the bodies receive sufficient nourishment from the synovial fluid to increase their size is not definitely settled, but the fact that, on studying a section of a free body we find the outer layer of cartilage in an excellent state of preservation, the nuclei staining well, whereas deeper in the body the cells show evidence of degeneration, would lend weight to the theory that the fluid does nourish the body. It seems probable, although it is not proved, that cartilage may proliferate under these conditions. In the detached bodies the bone is invariably found to be necrotic, whereas in the attached bodies with a blood supply, growing bone is found.

SYMPTOMS

The symptoms vary with the joint involved, according to whether the bodies are numerous, still attached, or free, their size, and so forth. Often the first complaint is of a little stiffness and inability to put the joint through a full range of movement. The common symptom is, of course, catching or locking of the joint, causing pain and a feeling of insecurity. Objectively the bodies may or may not be palpable, depending on their number and size, and the covering over the joints.



Fig. 1. Loose bodies in left hip joint.

REPORT OF CASE

Case A446938. The patient, aged thirteen years, presented himself for examination November 9, 1923. He was well developed, 5 feet, 4 inches in height, and weighed 115 pounds. The family history was negative, and he had had

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no infectious diseases. Seven and one-half years before, when he was six years of age, a ladder, which he was climbing, broke, and he fell a distance of 15 feet, landing on his feet. He was not badly hurt, but limped on account of pain in his feet. The following winter while skiing he spread his legs to such a degree that it hurt him considerably, and he could remember limping for quite a while on account of pain in the hip. In the summer of 1922 he was

synovial membrane was reflected from the anterior intertrochanteric line. This appeared to be the main site of the origin of the loose bodies, the mass having its origin just where the synovial membrane was reflected from the bone. This exostosis was smoothed down by the chisel and a thorough search of the joint for the loose bodies made by aid of a gallbladder scoop. A slightly movable, encapsulated mass could be felt at the point where the synovial membrane was reflected from the acetabulum at the upper border, and on cutting into this, two loose bodies popped out, indicating that the bodies had their origin not only at the site of the exostosis, but elsewhere (Fig. 2). As nearly as could be ascertained by visual inspection, which was naturally limited, and by palpation, the picture was not like that seen in some cases of osteochondromatosis, in which the synovial membrane is studded with bodies. The bodies varied in size from 1.5 cm. to 4 mm. (Fig. 3). Microscopic sections showed cartilage and bone in varying amounts, the amount of bone being greater than usual (Fig. 4). We did not feel sure that all the bodies had been secured, particularly from the posterior part of the joint, but I was unwilling to make a posterior incision at this time. The operation had already taken thirty minutes, and although

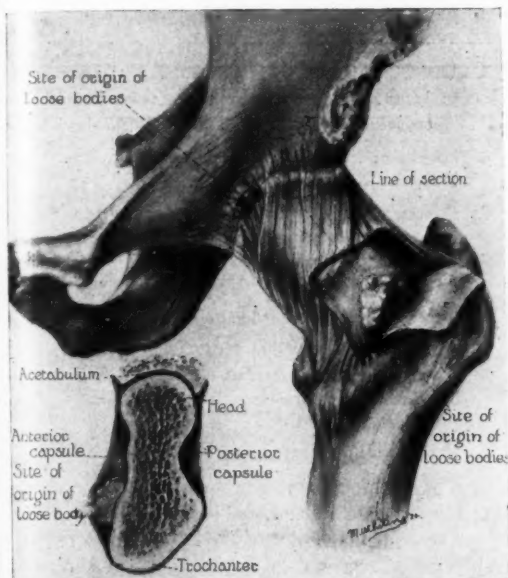


Fig. 2. Site of origin of bodies.

thrown from a truck, striking hard on the left hip joint. After this there was slight pain on movement of the hip. Four weeks before our examination, while riding his bicycle, he had an attack of quite severe pain, and a locking of the left hip lasting ten minutes before he was able to limp home. He kept quiet for a week, and although the hip has been sore and painful, he had had no more lockings. He walked into the office with a slight limp, but without cane or crutch.

Physical examination and examination of the urine and blood were essentially negative; the Wassermann reaction was negative. There was slight restriction of motion of the left hip joint in all directions. On flexing the hip, thus relaxing the anterior capsule, a mass could be felt, and some of the bodies could be palpated. The x-ray disclosed multiple loose osteocartilaginous bodies in the left hip joint (Fig. 1). Roentgenograms were made with the hip in inversion, eversion and in the straight position. It was impossible to count the bodies, but it was thought that there were between twelve and twenty.

The joint was exposed by a small Smith-Peterson incision running parallel to the long axis of the neck made into the capsule, and a number of free osteocartilaginous bodies, thirty-one in all, were removed. The gloved finger was then introduced, and an enlargement resembling an exostosis (Fig. 2) could be felt anteriorly at the point where the

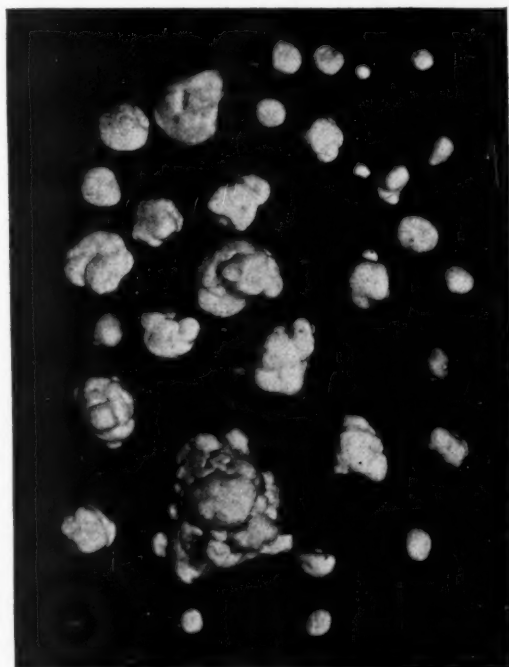


Fig. 3. Thirty-one loose bodies removed.

the patient's condition was excellent, I felt that the risk of infection would be increased by further search through another incision. The incision was closed and the patient put to bed without a cast. His convalescence was uneventful and he went home on the tenth day with motion quite free. A roentgenogram (Fig. 5) taken after operation showed that some loose bodies were still present. The patient and

his family were acquainted with this fact and told that if further symptoms arose, he was to return for exploration by a posterior incision.

Comment.—The history and findings in this case serve to emphasize certain points and facts concern-



Fig. 4. Section of loose body illustrating endochondral ossification. (a) Dark area represents cartilage. (b) Lighter area represents bone. (c) Fibrous tissue. Both cartilage and bone were necrotic.

ing osteochondromatosis. The condition was longstanding, and the patient had sustained three severe traumas to the left hip joint. Severe pain finally forced him to seek relief. In this case, therefore, from an etiologic viewpoint, trauma was a definite factor. At operation a definite tumor formation was found on the anterior intertrochanteric line (Fig. 2), at a point where the synovial membrane was reflected from the bone and where the stratum synoviale was probably three or four cells deep. We found, also, two bodies in a pocket at the superior margin of the acetabulum (Fig. 2) where the synovial membrane was reflected from the bone. These findings serve to corroborate the embryologic and neoplastic theories mentioned. Although Eden's case was the only one we found reported in the literature, undoubtedly other cases have been seen and treated surgically. Possibly they have not been reported, or are so buried in the literature that we could not find them. Eden treated his patient radically, performing an excision. The patient later was able to carry on his duties as a hospital orderly. From our standpoint this procedure appears too radical. Our patient is young, and if he has further trouble, there will be ample time to consider more radical procedures.

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Fig. 5. Several bodies still in posterior portion of capsule after operation.

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THROMBO-ANGIITIS OBLITERANS: WITH CASE REPORT*

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Thrombo-angiitis obliterans is a disease of unknown origin of the blood vessels or blood, characterized by obliteration of the vessels of the extremities, and followed by certain trophic and vasomotor disturbances.

Etiology.—It is a comparatively rare disease. It was first fully described by Leo Buerger, of New York. He believes it to be of an infectious origin of unknown etiology. Almost all of his cases occurred in young men, twenty-five to forty years of age, and of Hebrew descent, who were as a general rule heavy cigarette smokers. Willy Meyer¹ believes that the smoke poisons from cigarettes affecting a previously weakened nervous system may be largely to blame. Heredity probably plays no part, although more than one case in the same family has been reported. There is no connection between this disease and diet; since it occurs in males and not in females, some have advanced the theory that the endocrine glands play an important rôle. There are no known infectious diseases that are precursors of thrombo-angiitis, although typhoid fever is blamed by a few.

T. Mayesima² advances the theory that there may be an increase in the viscosity of the blood that is responsible, and Willy Meyer¹ further explains it as due to a change or disease of the blood itself that may cause the blood to coagulate when it flows through vessels of smaller calibre.

Pathology.—Leo Buerger³ describes it as an occlusive thrombosis of vessels with inflammatory reactions of vessels and with the end result of ulceration and gangrene. Veins either superficial or deep or both are involved in about 40 per cent of the cases.

He finds that it is a thrombotic process in the arteries and veins, occurring usually in the larger vessels, starting distally and working up. The thrombus is a red or mixed clot with giant cells, leucocytes, and disintegrated cells. The process is preceded, probably, and accompanied, by acute inflammatory changes and followed by organization and canalization of thrombus. Surrounding the ves-

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First of all, the health officer must in his own heart entertain for the medical profession the highest degree of respect. The health officer who outwardly cultivates the medical profession and who inwardly has contempt for their attainments in the public health field is sure to be found out. This does not mean that the health officer must or that he can regard the members of the medical profession as experts in public health. Distinctly they are not, but the fields of public health and medical practice have certain things in common, while, outside of this common ground, each profession covers much not included in the other. It should be the aim of every health officer to have very clear ideas concerning this common field, and in it to secure complete co-operation of the two professions.

At this point it may well be asked just what right has a health officer to feel that he is entitled at all times to the cordial support of the medical profession. This question has often been answered by stating that the medical profession differs from all other human callings in that its members are frankly devoted to the betterment of humanity and that, for this reason, they should always be willing not only to respond to all demands for charity work but should also regard it as their special privilege to give freely of their time in promoting the cause of public health.

While there may be much in this argument, it is safer to assume that doctors, first of all, are men constituted as are other men, having their own livelihood to consider and not receiving such special consideration from the general public as calls for their giving to the public more than do the members of other professions.—E. C. Levy, M.D., *Am. Jour. Pub. Health*, Dec., 1923.

sel there is usually fibrotic tissue that binds down artery, comites and accompanying nerves.

Laboratory Findings:

1. Chemical blood examination.

Bernhard⁴ found that the chemical blood examination was normal for its nitrogenous constituents, cholesterol, chlorides, the carbon dioxide combining power of the blood plasma, and calcium. However, he found a definite hyperglycemia reaction peculiar to this disease.

2. Microscopical blood examination. H. M. Thomas⁵ reports a case of persistent leukocytosis.

3. Stomach analysis: negative.

4. Roentgenology: negative.

Bones show no changes until attacked by gangrene or osteomyelitis, which usually occurs late in the disease.

5. Basal metabolism: normal.

Symptoms.—The symptoms at first are rather vague, and often diagnosed as rheumatic, weak foot, frost bites, et cetera. Among the first symptoms are pain in the extremities, coldness, tingling, and cyanosis. As the disease progresses, the pains usually increase in severity and may become excruciating, or may take the form of intermittent claudication; the pain may be absent. The extremity usually assumes a congested appearance—rubor—in the dependent position, or a waxy livid hue when elevated. There is either an absence of the pulse or a very faint one, depending on the stage of the disease. There may be scattered phlebitis—the patient complaining of “hard lumps” or “strings” under the skin. Ulcerated areas usually form, which are very rebellious to treatment. The ulcerated condition may heal, and subsequent ulcers may form, which eventually develop into gangrene. This may be a wide, rapidly spreading gangrene, or it may be confined to the distal digits. The lower extremity is usually involved—very rarely the upper.

To sum up we may say that the important symptoms are pain, intermittent claudication, scattered phlebitis, rubor or blanching of foot depending on posture, disappearance of pulse, ulceration and gangrene.

Complications.—As this is usually a chronic disease, any of the infectious diseases may complicate it and end the scene.

As these individuals suffering from it are more or less of a neurotic temperament, they get to worrying about their condition, so it is not uncommon

to find various mental states. Some even get so mentally deranged as to commit suicide.

Moist gangrene and pyemia are most to be dreaded, as when these develop they are usually fatal.

Diagnosis.—The clinical diagnosis as given by Buerger⁶ rests upon the following:

1. “The racial (Hebrew) and sex (male) predilection.
2. The early involvement of the lower extremities.
3. The early symptoms of pain or intermittent claudication.
4. The presence of migrating phlebitis.
5. The evidence of pulseless vessels.
6. The presence of blanching of the extremity in the elevated position.
7. The existence of rubor in the dependent position.
8. The relation of hyperemic phenomena to posture.
9. The absence of simultaneous, symmetrical involvement.
10. The slow, progressive chronic course terminating in gangrene.”

Differential Diagnosis.—The diseases that may be confused with thrombo-angiitis obliterans are Raynaud's disease, scleroderma, sclerodactyl, syphilis, tuberculosis, diabetes, arteriosclerosis, erythromelalgia.

Raynaud's disease is a disease of unknown etiology. Its pathology is not exactly known. The lesion is thought to be somewhere in the central nervous system. There is alternating blushing and blanching of the foot. This disease is characterized by intermittent attacks with normal intervals. The pain has always a distinct nerve distribution, and usually in symmetrical parts. The areas affected in the thrombo-angiitis obliterans always correspond to the vessels affected, which is not true of Raynaud's disease. There is always atrophy of the distal phalanges in Raynaud's disease which you do not find in the thrombo-angiitis obliterans, until gangrene has advanced to such a degree as to cause definite changes in the bones.

Diabetes and senile gangrene are usually easily differentiated by the physical and laboratory findings.

In erythromelalgia the plantar surface of the foot is red and glistening while the rest of the foot is pale and atrophic.

Both scleroderma and sclerodactyl can be differentiated by the fact that there is atrophy of the distal phalanges, and by the first stage of hard edema.

In syphilis there are usually other signs of syphilis present along with a positive Wassermann.

An ulcerated condition in cutaneous tuberculosis is usually accompanied by changes in the lungs, and in the later stages it is easily distinguished from thrombo-angiitis obliterans.

Course.—Thrombo-angiitis obliterans runs a chronic course. It usually starts with vague rheumatic-like pains, intermittent limping, ulcers, and finally gangrene develops. It may end fatally either by wide spreading gangrene, pyemia, or by thrombosis of some of the important vessels to the brain, liver or lung, or by some other intercurrent disease. Some cases seem to recover entirely.

Treatment.—The treatment may be either medical or surgical or a combination of both. Emphasis cannot be laid too strongly on the conservative treatment first, which of course entails an early recognition of the disease. Many a case is reported in the literature where a wrong diagnosis was made, and treatment instituted that resulted disastrously for the patient. Any local surgery of the ulcerative process in the disease will invariably end in gangrene.

Steele,⁷ of Philadelphia, uses large doses of 2 per cent sodium citrate intravenously along with hot air locally and 10 grains of potassium iodide, internally three times a day. His treatment is carried out over a long period of time—a year or more.

Sinkoe,⁸ of Atlanta, has successfully used the Bier's suction apparatus.

Willy Meyer⁹ advocates the use of Ringer's solution by hypodermoclysis in conjunction with intravenous solutions of sodium citrate, glandular extract, and, if needed, conservative surgical treatment.

H. F. Wolf¹² has been successful with diathermia.

After gangrene has set in it is best to mark time, if possible, with intravenous solutions of sodium citrate, hypodermoclysis of Ringer's solution with potassium iodide internally, heat and massage until there is definite demarcation, and then do as little surgery as is consistently needed.

High amputation should not be resorted to unless all other measures fail, and the patient is in great danger of his life.

All foci of infection should be removed.

Arterio-venous anastomosis has not been successful by all that have tried it, so it is not to be recommended as a primary measure.

Heat or Bier's suction apparatus are both undoubtedly of some value.

The following case is interesting because it emphasizes the need of very careful histories and examinations, before minor surgery of the feet should be undertaken. There are a number of cases reported where the patient suffered the same consequences as this one did, just because the surgeon was too ready to use the knife. Mr. H. D. had an ulcerated condition under his big toe which had resisted all home treatments. He consulted an orthopedist, who immediately excised the ulcerated tract and put on a salicylic acid dressing, to remove the remaining calloused condition. In about twenty-four hours the foot became greatly inflamed, and painful and in another thirty-six hours gangrene had set in.

It is interesting from another standpoint because this patient was not of Hebrew descent, as are most of the cases reported.

Before presenting this case due credit must be given Dr. Edward Evans, of La Crosse, Wis., for making the diagnosis.

Present complaint. Mr. H. D., aged 37. A lumberman by trade, came to me on November 24, 1921, complaining of an ulcerated condition under the proximal phalanges of big and little toe.

Family History. Father living and well at the age of 62. Mother died at age of 65, from heart failure. It is interesting to note that the mother always had trouble with her feet. She was troubled considerably with rheumatic pains in the legs and never was able to walk any distance without resting. It was common to have her complain bitterly at nights with severe cramps in her thighs. Two brothers living and well. One sister dead, of measles. Otherwise family history was negative.

Marital History. Married 15 years. Two children living and well. No miscarriages. Wife living and well.

Occupational History. Lumberman for last eighteen years.

Past History. Previous health: He always enjoyed fairly good health. He has had considerable trouble with his feet for last fifteen years, and in 1903 he had typhoid fever. Tonsillitis often while a child. No other diseases.

Veneral: Negative.

Head: Negative.

Cardio Respiratory: Occasionally some dyspnea on climbing stairs.

Gastro Intestinal: Negative.

Genito Urinary: Negative; no symptoms of diabetes.

Skin: Negative, except for calluses under right foot.

Weight: About normal.

Habits: He was not a total abstainer of liquor, but very seldom used same to excess. Smokes about twenty cigarettes a day and cigars and pipe occasionally.

Present Illness. Patient has had rheumatic pains in his feet for years and for about the last ten years has had occasional spells of severe cramps in thighs, coming on shortly after going to bed and lasting from fifteen minutes to three hours. These pains have been coming on more frequently and severe during the last few years. Lately has had pains in calves of legs on walking any distance, which disappeared on resting. In the fall of 1919 he developed an ulcer under the big toe of the left foot, and about six months later developed one under the right big toe. The left toe healed up in about six months. The treatment consisted of hot foot baths, and frequent applications of a mild antiseptic. The ulcer under the right big toe has resisted all treatment.

Physical Examination. Patient a well developed male, age 37, of French, Irish, and German descent.

Head: Negative.

Neck: Negative.

Thorax: Negative, except for slight mitral regurgitation.

Abdomen: Negative.

Extremities: There is a perforating ulcer under the big and little toe of right foot, with considerable callus formation surrounding. The foot assumes a congested mottled appearance in the pendent position, and pale appearance in the elevated. There is an absence of the pulse in the anterior and posterior tibial in the right leg and dorsalis pedis in the left but it is present in the popliteal. There is an old scar on the left big toe from a previously healed ulcer.

Reflexes: Normal.

Blood Pressure: Systolic 125, diastolic 80.

Hemoglobin: 85 per cent. **White blood cells:** 9,500.

Urinalysis: Negative.

Course. In February, 1922, patient consulted an orthopedist, who immediately cut out ulcerated edges and put on a salicylic acid dressing, on the calluses. In a few days gangrene set in, involving three of the toes and an area on the dorsum of the foot. On February 21, 1922, the patient consulted Dr. Edward Evans, of La Crosse, Wis., who made a diagnosis of thrombo-angiitis obliterans.

Patient on admittance to the hospital presented the following: Temperature 102 degrees, pulse rate 100, respiration rate 20. Right foot was very considerably swollen for a couple inches above the ankle. Great redness of the whole dorsum of the foot, though plantar surface was not swollen or reddened. The little toe was entirely gangrenous, black, dead, and the metatarsal phalangeal joint of this toe was open and the bone exposed. Under the ball of the great toe there was a small perforating ulcer which did not seem to reach the tendon. There was some blistering and blackening of the skin and one small superficial patch of gangrene just back of and outside the nail; did not seem to be any suppuration under the nail. The patient had the history of having had quite a high fever.

The subsequent course was one of progressive gangrene with infection until all the toes excepting the middle were involved. The foot was entirely healed by April, 1923.

However, it is still cold and clammy and has only faint pulsations in vessels and becomes edematous, if it is used very much.

Clinical Laboratory Reports. Urine showed a trace of albumin on three occasions, while in hospital. Blood examination, Feb. 21, 1922: hemoglobin 96; red count, 4,200,000; white count, 16,000; polymorphs, 94 per cent; blood sugar, .09 per cent. Patient has shown a persistent leukocytosis ever since.

Roentgenolgy report: Negative.

Treatment. The treatment consisted of heat, intravenous injections of 2 per cent sodium citrate or normal saline, massive internal doses of potassium iodide, mild antiseptic local dressings, and conservative surgical treatment. Patient was given in all about fifteen intravenous injections, of either normal saline, or 2 per cent sodium citrate. Two hundred to 800 c.c. were given at each injection.

Two minor operations were performed by Dr. Edward Evans.

The first one consisted of removing some dead gangrenous and infected tissues, on the dorsum of foot, and opening wider the sinus under the little toe, to permit better drainage of pus.

The second one was performed about five months after gangrene had started and consisted of removing stump of big toe, back to tarsal bone, as there was a persistent infected sinus at base, and amputation of second toe, as this also had a persistent infected sinus leading to its proximal joint. During this operation it is interesting to note that there was very little blood lost, about twenty drops, showing a very poor circulation. No sewing was undertaken. The foot healed completely in about nine months after last operation was performed.

Conclusions. This is undoubtedly a case of thrombo-angiitis obliterans. There are a few points of special interest in connection with this case, namely:

1. The patient was not of Hebrew descent.
2. The value was shown of a careful history and physical examination before any surgery of the extremities should be undertaken.
3. There has been undoubtedly a persistent leukocytosis present in this patient, analogous to the case reported by H. M. Thomas.⁵

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DISCUSSION

DR. J. F. CORBETT, Minneapolis: I am very glad that Dr. Christianson has taken the time and made the effort, in a very busy life, to give us this carefully prepared paper. Now, why is thrombo-angiitis obliterans an important subject? In the first place, it affects young individuals; in the second place, it is a slowly progressive disease—it will go through a long series of years; and, in the third place, it is usually an intensely painful disease.

In the early diagnosis we have no cardinal points that I can enumerate. These cases sometimes present a picture of an osteomyelitis. Frequently they are operated upon for osteomyelitis of the great toe, probably due to the fact that the bones early undergo a lack of nourishment. Other cases are thought to be cases of neuritis. All cases have an antecedent history of pain and usually the characteristic of the pain is that it comes on with exercise. An individual may be perfectly free from pain for a long period of time. Let him walk six blocks; then the pain comes on and it will be so intense that, no matter where he is, he will stop and try to support himself in some way and rest his leg.

Early there is a change in the vessels. Oftentimes before gangrene develops, before we have absolute characteristic local appearance, the vessels can be distinctly palpated. Unlike senile gangrene this does not start at the periphery and work backwards, but is very apt to involve some of the larger vessels early. Moszkowicz's test for the collateral circulation, palpation of the superficial arteries for pulsation, palpation for consistency, are important points.

Now, what is there in the treatment? Amputation is a very poor treatment for thrombo-angiitis obliterans. We have been taught, as a surgical principle in senile gangrene, to operate at the lower third of the thigh; but amputation at the lower third of the thigh in thrombo-angiitis obliterans is often followed by some disastrous consequences. Any local operation, I believe, is apt to be followed by very severe and disastrous consequences unless very careful tests of the collateral circulation have been made and the proper point of amputation is selected.

Then what have we in the way of treatment if amputation and operation is not available? Bier's treatment properly applied—and by Bier's treatment I do not mean what is so commonly understood as Bier's hyperemia, which is mainly the application of elastic bandages, but rather the obtaining

of hyperemia through the agency of heat. Bier has published a beautiful little monograph, telling us exactly how to use Bier's hyperemia treatment of hot water; go from mild cold water to mild warm water and as time goes on increase the range of temperature, and by that means put the vessels through a course of gymnastics. Sometimes the patient has so much pain that he will not do that and I have used another expedient, that is to develop collateral circulation by the application of moist heat at the exposed points of the vessels, for instance, the popliteal space or in the groin.

I have seen a man with one leg already amputated, with a sloughing stump, with some process manifest in the other leg, where disaster seemed inevitable, to yield to this sort of treatment. If the condition was very severe, simply wrapping the affected part in heavy cotton and keeping it warm has sometimes allayed that sort of a condition. The use of citrate, I believe, has not passed the experimental stage. At one time we were giving subcutaneous injections of Ringer solution, but that has been abandoned. Most successful results have been obtained by the use of the Bier hyperemia treatment.

DR. EMIL S. GEIST, Minneapolis: Dr. Christianson has given a good exposition of practically all we know at this time regarding this mysterious ailment. He reports a rather advanced case in which progress was very favorable. Unfortunately, this does not happen in those advanced conditions where extensive gangrene has already set in. I am sure that Dr. Corbett did not want to say that amputation is never necessary, because in advanced cases amputation occasionally is indicated. When amputation is indicated it should be high, above the knee and above the bifurcation of the femoral artery.

Some months ago I prepared a paper on foot conditions which will be published shortly, which involves the study of seven hundred eighty-one consecutive cases of foot disability. In twenty-five of these cases, the foot complaint was directly attributable to interference with the arterial circulation. The symptoms were usually bilateral, it usually appeared in Jewish males, the average age was fifty.

As to symptoms, there were pain at night, cramps on use, complaints of feet getting cold easily; sometimes there occurred swelling and numbness; the dorsalis pedis pulse was absent in all of them. X-rays occasionally showed atheromatous changes. The wearing of arches and braces usually increased the discomfort. There is no doubt in my mind that tobacco, coffee and other stimulants play a considerable rôle in the etiology of this ailment.

As for treatment, Dr. Christianson has well and wisely outlined the treatment of these early cases, based upon the early recognition of the disease. In addition to what has already been said regarding therapy, heliotherapy should be considered. I believe that this remedial measure is distinctly indicated and has been of distinct benefit in a considerable number of my cases. During the past few years, Koppis, Schmaff and others have operated on the femoral artery, doing what is termed periarterial sympathectomy. I have had no experience with this operation.

DR. EDWARD EVANS, La Crosse, Wis.: Those of us removed from the large centers of scientific investigation, reading the literature of thrombo-angiitis obliterans, I

think get more confusion from it than anything else. Apparently very little is yet known about the fundamental underlying pathology of the disease. The case report as given so splendidly by Dr. Christianson was, I think, undoubtedly a case of this sort. Until we know more about its underlying pathology I think we have only to go along experimentally, feeling our way and, as Dr. Corbett has said, not do too much.

One thing I would like to say, as one who has been interested for a very long time, both actively and otherwise, in state medical associations, I cannot help saying that I feel it is a splendid thing when you men make up these programs for the state societies to get young men from small places engaged in the general practice to present papers. I think it was Sir James Mackenzie who said that until we get back to the clinician who first saw the case and get his viewpoint of it, we are not going to get very far along clinical lines. I am mighty glad to know that Dr. Christianson, in spite of the demands upon his time through his busy practice, found the time and had the scientific spirit and clinical acumen to present a paper like that to this society.

DR. MOSES BARRON, Minneapolis: This subject is very interesting because it deals with one of those diseases concerning which we know very little. I had the opportunity of studying two cases. Both of these patients were Russian Jews. The two types of treatment suggested were used in these cases. The first case was that of a man about forty-five years old who had had a history of pain in his foot extending over a period of about twelve to fourteen years. I saw him in consultation with a surgeon and at that time there was an area of gangrene over one of the toes. He was complaining of severe and excruciating pains. He was sent to a hospital and there he was given repeated injections of sodium citrate. At first it was thought there was some improvement, but later the pain became severe again and an operation was advised. A low amputation was performed, but gangrene set in the flaps and the leg had to be re-amputated higher up. Shortly after this, however, the patient died.

The second case is of unusual interest. This patient also was in the forties. He had complained of pain in the toes of one of his feet for a long time. The pain was constant and so severe that he could not get any rest. Many nights he would not get more than one or two hours of sleep. He would pace the floor most of the night. He consulted one

doctor after another without much relief. He had visited doctors in other cities. I happened to see him during several of his attacks of pain at night. The history together with the appearance of the foot suggested strongly thrombo-angiitis obliterans. He was being treated at the time by a surgeon with heat and other measures with very little relief. He then developed pain in the great toe of the other foot. He was advised to see a chiropodist, who at once diagnosed it as an ingrown toe-nail. The chiropodist attempted to treat the toe-nail. This resulted in infection and a rapidly spreading gangrene of the great toe. The gangrene was spreading so rapidly that the surgeon was at once called and the patient ordered to the hospital for operation. An amputation was performed rather high up the leg. The patient made an uneventful recovery, and the very striking feature of this case is that he has had practically no pain since in the originally affected leg, though it was the other leg which was amputated. I examined the tissue of the amputated leg. It was typical of thrombo-angiitis obliterans. The anterior and posterior tibial arteries with their branches appeared like pipe stems, or rather cords of tissue. Microscopically, they showed the lumina occluded with the fibrosis, in some areas showing blood pigments as from an organized thrombus. There was a leukocytic infiltration throughout the blood vessel walls extending into the adventitia. The gross and microscopic pictures were identical with those described by Buerger.

The interesting facts in the above cases are that one man was treated with sodium citrate with no relief, and later he died following amputation. The second case was not treated with sodium citrate but relief was obtained by having the other leg amputated than the one which gave him the excruciating pain. The diagnosis of this case was established by gross and microscopic study.

DR. H. W. CHRISTIANSON (closing): I have been asked why it attacks the Jews more frequently than other races. I think that it is Willy Meyer, of New York, who believes it is partly due to a previously weakened nervous system. That is, the Jews have been oppressed for many centuries and consequently have acquired a neurotic temperament. He believes that for this reason, the disease is more prevalent among the Jews.

The blood pressure determinations are usually sub-normal. However, although the determinations usually run from sub-normal to normal, exceptions show a slight rise. The reason for this, I cannot explain.

STUDENTS' HEALTH SERVICE AT THE UNIVERSITY OF MINNESOTA

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Although for ten to fifteen years numerous of the leading American universities have had organized departments to care for the health of their student bodies, the University of Minnesota made no provision to assume this responsibility until after the outbreak of the late war. Then with the establishment of a Reserve Officers Training Corps at the university, the United States Army provided medical service for students belonging to this training corps. The advantages to be derived from this medical service were so evident that arrangements were made by the university authorities to extend the service to all students of the university. In 1918 a beginning was made and the first staff, in reality an emergency one, was organized.

The first two years of this new organization were particularly trying ones. The war made it difficult to obtain sufficient and satisfactory medical service and the two years of influenza, which happened to come at this time, swamped even the most highly developed of medical institutions. The Students' Health Service, however, was able to weather the storm and since then has been rapidly developing into an efficient, scientific organization for the protection and conservation of the students' health.

PURPOSE

The purpose of the service, simply stated, is to assist each student to have and to enjoy the advantages of the best possible health. To accomplish this purpose, however, numerous lines of activity are necessary. Physical defects must be discovered and assistance given to the student in correcting them. Precautions must be taken to prevent the introduction and spread of communicable diseases. Medical advice and care must be made available so that students will seek care for diseases while they are still in their incipency; and the student body must be educated as to the value of periodic physical examinations and regular medical service.

CLINICAL STAFF

The staff of the Health Service for the current year consists of fourteen physicians, eleven den-

tists, ten graduate nurses, three dental assistants, one laboratory and x-ray technician, stenographers, clerks, etc. Of the physicians, six are on full time and eight on part time; of the dentists, one is on full time and ten on half time. The staff includes physicians well trained in internal medicine, diseases of the chest, surgery, ophthalmology and otolaryngology, physical therapy, gynecology, and dermatology and genito-urinary diseases. With such a staff consultations are frequent, and the advantages of group medicine are available to every student. The students are also encouraged to call in consultation at their own expense physicians not connected with the Health Service staff. In cases in which students cannot afford to pay or in which staff physicians desire consultation for their own satisfaction, the various clinical departments of the Medical School have generously given their services.

EQUIPMENT

The Health Service maintains two institutions, one on the main campus and one on the agricultural campus. The former is temporarily located on the ground floor of Pillsbury Hall. This location near the center of the campus is a happy one, but the building and the available space are far from satisfactory. It is hoped and expected that within a few years a new building will be erected for the Students' Health Service. This building, too, should be situated on the academic campus and as near to its center as is possible. The expense of maintaining a Health Service so situated will be greater than though it were included in the group of medical buildings, but the better service to the student body, due to its easy accessibility and to the fact that in it students are less apt to feel that they will be used for teaching purposes or be treated by medical students, will more than justify the additional expense.

At present in Pillsbury Hall a medical and a dental dispensary and an infirmary of twenty-five beds are maintained. In conjunction are an operating room, a laboratory, a small x-ray and fluoroscopic equipment, and a pharmacy. On the agricultural campus a separate building was assigned to the Students' Health Service and completely remodelled to suit its needs. In it we now have a very satisfactory out-patient dispensary and a hospital of forty beds, most of them in small rooms.

PHYSICAL EXAMINATIONS

The beginning of the physical examination of freshmen students at the University of Minnesota is deserving of special mention. Years ago, with little or no encouragement and with no assistance, Dr. L. J. Cooke, of the department of physical education for men, began to examine freshmen. His other duties were more than sufficient to occupy his time, but believing in the importance of physical examinations he kept at them and during the year personally examined each one of the freshmen men. From this beginning the progress has been gradual until now every student entering the University or the University High School must have as part of the requirements for matriculation a physical examination. If a student first enters the University High School, a second examination is required when he enters the university proper. An additional examination is required of those students who enter the medical school and another is given at the beginning of the third year in medicine. Furthermore all athletes who compete in intercollegiate sports are required to have an examination at the beginning of each season, and every student who desires a locker in the gymnasium must have a medical inspection and an examination if his previous record shows any indication for it.

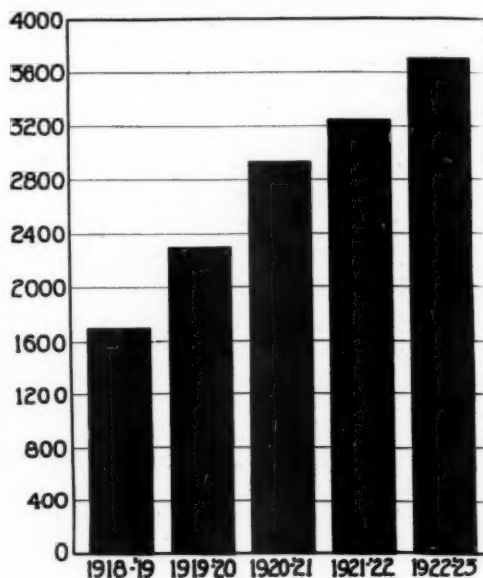
These physical examinations are extremely exhaustive, comprising, in addition to a careful history of past illnesses, complaints and family tendencies, blood pressure readings, reclining and standing; pulse rate before and after exercise; vital capacity; height, weight and chest circumference measurements; general orthopedic inspection; examination for hernias, goiters, venereal disease, etc.; visual and hearing tests; eye, ear, nose and throat examinations; physical examination of heart and lungs; dental examinations; urinalyses; Schick tests; nose and throat cultures; Dr. Larson's precipitin test for tuberculosis—the so-called "ring test"; and smallpox vaccination of all students who need vaccination and who do not flatly refuse it. Upon the completion of an examination one of the members of the staff sums up for the student the findings recorded, advises him as to any medical or dental care that he needs and gives him a classification on the basis of his physical condition. A card index is then made of those students who showed any of the more serious defects and during the year these students are called

back for re-examination. A discussion of the results of these examinations would be interesting, but space will not permit of it at this time.

MEDICAL AND DENTAL SERVICE

The Health Service maintains an out-patient dispensary for students at which one or more physicians are in attendance at all hours of the day.

DISPENSARY VISITS ON MAIN CAMPUS
PER 1000 REGISTRATION OF COLLEGIATE GRADE



To this dispensary students are encouraged to come upon the first appearance of symptoms of illness, the prevention of disease being the primary purpose of the service. The student who comes to the dispensary is examined, given immediate treatment if any is indicated, and advised as to what he should do. If his condition indicates that he should remain in bed, he is directed either to go home to bed and call his family physician or to enter the students' infirmary. At the infirmary the student is cared for until he can return to classes, or, if his illness happens to be a prolonged one, until he can be removed to his home or to a private hospital. A student who becomes ill at his room will be visited once by a physician from the Health Service, but for prolonged treatment it is necessary that he enter the infirmary or call a private physician.

A dental clinic of six chairs was recently added

to the Health Service dispensary. Here dental examination, prophylaxis and reparative work are made so easily available that no student should neglect his teeth.

During the school year 1922-23 students made 35,654 visits to the Health Service dispensary (of these probably ninety per cent would never have reached a physician in private practice); 861 students were admitted to the infirmary and stayed on the average just 3.7 days; 578 calls were made upon students at their rooms; and 6,233 visits were made by students to the dental clinic.

THE CONTROL OF COMMUNICABLE DISEASE

In universities located in large cities and having a large percentage of their students living at home, as is the situation with the University of Minnesota, the control of communicable diseases is extremely difficult. Many precautions, which would be unnecessary were the university an isolated community, must be served. In general the routine is as follows: (1) the careful examination for communicable diseases of all students who come to the Health Service dispensary; (2) isolation of all students with symptoms suggestive of a contagious disease; (3) quarantine of all cases or suspected cases of contagious diseases; (4) daily observation or isolation of close contacts; and (5) inspection of all students who have been absent from classes on account of illness and wish to obtain excuses for the time missed. By this last precaution alone we were able during the past year to identify and exclude from classes one case of open pulmonary tuberculosis; two cases of smallpox; one case of diphtheria; one case of scarlet fever; numerous cases of acute follicular tonsillitis, etc.

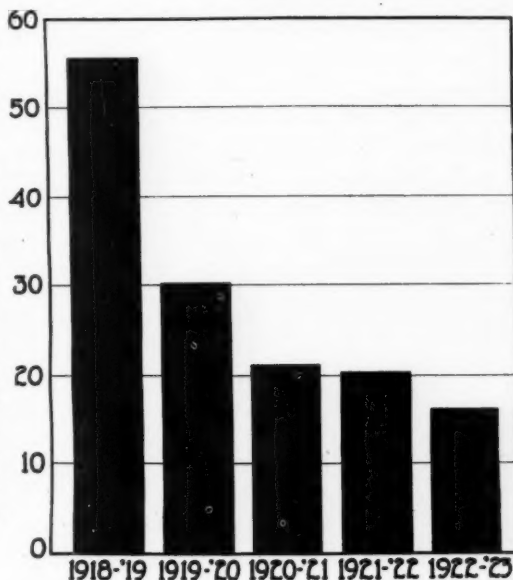
POLICIES

The policies which are followed by the Students' Health Service have been formulated to provide for the students the best possible health supervision; to make available to them adequate dental care; to teach them to seek medical care whenever such care is advisable; and to interfere as little as possible with the private practice of physicians in the vicinity of the university. The prevention of diseases, the correction of defects, and the practical health education of the student body, are the paramount aims of the service. To make possible the accomplishment of these aims, however, a certain amount of general and specialized treatment of

disease is necessary. Students must have confidence in the institution and learn that it has a service to render them; otherwise they will not seek its advice at the time most important for the prevention of disease.

Upon the completion of his physical examination, each student is instructed as to any defects or abnormalities which are discovered and advised to seek the necessary medical or dental care. Each year, as a result of this advice, many students go to practicing physicians for further examinations or for treatment. Others who are working their way through school or who live away from

**HOSPITAL PATIENTS
PER 1000 DISPENSARY VISITS**



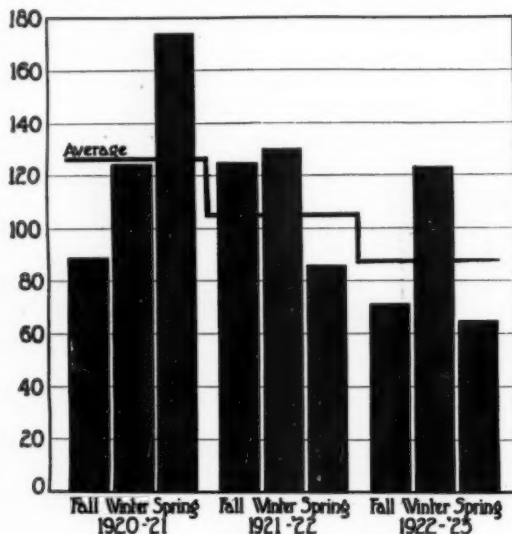
the Twin Cities return to the Health Service for further care. During the school year students who visit the Health Service dispensary are examined and advised as to their conditions. If they live in the Twin Cities and need further care, they are advised to return to their homes and call their family physicians. If a student needs an operation, other than an emergency, and can afford to do so, he is advised to go to a private hospital and call a private physician. Students with prolonged illnesses who are admitted to the infirmary are transferred to their homes or to a private hospital as soon as their conditions permit. By observing

these policies it has been possible to gain the confidence and support of the student body without infringing upon the physicians in private practice.

MAINTENANCE

As part of his tuition each student pays a health fee of two dollars per quarter, six dollars for the school year. From these fees sufficient funds ac-

**HOSPITAL DAYS, MAIN CAMPUS,
PER 1000 DISPENSARY VISITS.**



crue to pay the salaries of the staff, exclusive of dentists, and to cover most of the basic supplies and equipment. Students who receive services that entail extra expense to the institution are expected to pay on a cost basis for such services; for example, a charge for board and laundry of two dollars per day after two days is made to students confined to the infirmary; drugs are dispensed on a cost basis; x-rays are charged at cost and an operating room fee of ten dollars is charged for a major operation and one of five dollars for a minor operation. These charges are made to all students who receive such services, but a special provision makes it possible for the dean of student affairs to cancel the bills of especially deserving and needy students.

The dental department is required to be entirely self-supporting. To do this the charges for dental work are adjusted so that they will just cover salaries, materials, supplies, and depreciation on equipment.

ACCOMPLISHMENTS

It is frequently difficult to affirm with certainty that a particular form of treatment was responsible for a patient's recovery or that a certain preventive measure brought about the decline of an epidemic. Similarly in such work as the Health Service is carrying on it is difficult to measure accomplishments accurately. Before the establishment of the Health Service there was no accounting made of time lost because of illness nor was any record kept of even the serious illnesses among the student body, so nothing is at hand with which to compare present figures. A rough general comparison, however, can be made of the five years during which the Health Service has been in operation by comparing the following charts.

These charts show a progressive increase in the use which students are making of the dispensary and a corresponding decrease in the percentage of these who are sick enough to be sent to the infirmary. The decrease in the ratio of hospital days to dispensary patients is also significant.

Such figures as these can show definite accomplishments but they can never tell the whole story. The number of boys and girls who, except for the protection afforded, would have contracted communicable diseases, the amount of invalidism prevented by discovering chronic diseases in their incipency, and the lives saved by prompt medical surgical treatment will never be known and cannot be estimated. But even if we could have all of these accomplishments carefully itemized and tabulated we would still not have reached a sum total of the results of the work. One of the most important phases of the work would still have been overlooked. That is the educational phase. Certainly practical health education is one of the greatest opportunities of the service and one which is constantly emphasized. These thousands of students, most of whom have never before had a physical examination, are shown the value and the importance of periodic physical examinations and are taught to appreciate and to seek medical service whenever they become ill. They are vaccinated against smallpox and given Schick tests and they learn the value of these preventive measures as they would never learn them from formal instruction. The results which will accrue from such phases of the work one can never measure but every observer is convinced that they will be even greater and more far-reaching than the immediate and more tangible accomplishments.

PRESIDENTIAL ADDRESS
Minnesota State Sanitary Conference
November 2, 1923

GEORGE S. WATTAM, M.D.
Warren, Minnesota

In being permitted to address you today in the rôle of your presiding officer, I feel that I am accorded an unusual privilege and an honor most sincerely appreciated.

In accepting this trust at your hands, I assume the responsibility and the difficult task of endeavoring to contribute something that may be of interest and of value to those in attendance, and, through you, benefit the cause that we represent; but I promise not to weary you by a lengthy discourse, nor by quoting of tiresome statistics. The office of the State Board of Health, in an untiring effort to make this meeting a success, among other things, has provided, in concise form, a sheet giving statistics which I wish to commend to you for thoughtful perusal. It is worthy of careful analysis.

Many of you coming here to participate in this work do so at a sacrifice that can only be recompensed by the personal satisfaction of feeling that you are adding something to the welfare of your fellow citizens in assisting in solving some of the problems of modern sanitation; and, in behalf of the State Board of Health and the officers of this conference, I welcome you and your co-operation in the business of this session.

At this time we are in the midst of a financial distress and a mental unrest that history tells us is a logical sequence of all great wars; and when we try to give serious thought to estimating the huge loss of life, the destruction of property, and unreckoned misery which years of turmoil in Europe brought to the whole world, we are lost in wondering how so much of happiness and well being could have been preserved to the citizens of these United States. "Every cloud has a silver lining," and while we cannot replace the inanimate wealth so recklessly destroyed, nor the millions of lives so wantonly sacrificed, yet we have this consoling thought: Out of the chaos emerged a wealth of sanitary knowledge and a manifold increasing interest in all problems relating to health and the preservation of life.

We can, therefore, while reviewing with satisfaction the results of past endeavors to curtail disease,

look hopefully into the future for brighter prospects of attaining to the ideal. New agencies for the sale of sanitary knowledge are in the field, inspired on the one hand by a greater interest man now has in the welfare of his fellow man, and on the other by undeniable evidence that freedom from disease is an essential factor in material prosperity.

"Ill fares the land, to hastening ills a prey, where wealth accumulates and men decay." Influenced by the spirit of this thought of Goldsmith in the eighteenth century; our great employers of labor, controllers of wealth, are recognizing that accident and disease take an enormous unnecessary toll, and that it is cheaper to prevent than to cure.

The great insurance companies, powerful manufacturing corporations, believing it to be a good investment, are freely giving thought and money to modern sanitation, and our nation and state are appropriating, in increasing amounts, to assist in combating unnecessary disease. That most splendid and beneficent organization of historical mention, the American Red Cross, seeking new fields for its various activities following the recent war, turned a portion of its powerful influence for good into the hopper of better health. Churches, fraternal and business organizations, too numerous to mention, are all lending a helping hand, and it is an inspiration for all engaged in this cause to know that health work done in the past has not been in vain. In fact, if we but recall the havoc that communicable disease has caused in the past, we have every reason to view the future with optimism.

The Metropolitan Life Insurance Company tells us that a lessened death rate since 1911 saved that company nearly twelve million dollars in the year 1922; and we are also told that in the past thirty years twelve years has been added to the life of civilized man by modern methods of disease prevention.

Typhus fever, yellow fever and cholera, that from time to time scourged these United States, have been banished for good, and bubonic plague has never been able to gain a foothold in this country. Malaria and hookworm, so recently strong factors in causing ill health and poverty, are facing extermination.

Turning to our own State of Minnesota, we have every reason to be proud of the record made by our State Board of Health and its official and non-official auxiliaries.

Our State Board of Health, beginning its work

in 1872 on a petty sum of \$500.00, is now receiving an annual appropriation of \$145,500.00, or two hundred and ninety-one times the amount allotted for this splendid purpose at its inception some fifty years ago. In addition to this, the state and county sanatoria for the care of patients having tuberculosis are costing the State of Minnesota \$242,000.00 annually, making a gross amount of \$387,500.00. This appears like a very large sum to many members of our state legislature when we appeal to them once in two years for necessary financial assistance. Indeed, it is a large sum of money, and we may well ask: Is Minnesota justified in making this expenditure? Let us see!

The Division of Vital Statistics of the State Board of Health tells us that had the same death rate prevailed in 1922 that did in 1871, we would have had 5,538 more deaths in 1922 from five diseases, viz.: smallpox, tuberculosis, scarlet fever, diphtheria and typhoid. A saving of 5,538 lives in one year in only five diseases. Estimating the value of each human life saved at \$100.00, or the price of a fairly good cow, and at the end of the year we have returned to the State its \$387,500.00 and interest at 42 per cent. A pretty good investment! But if to this we shall add the saving of a decreased death rate from pneumonia, measles, whooping cough, diarrhea and other preventable diseases of childhood and youth, we will probably have saved a sum nearly equal to above amount, which is all "pure velvet." In addition we should add the cost of care of the sick, loss of time, and expense of burial—a mathematical problem that I have not had the time to solve. Yes, a saving of probably more than 10,000 lives annually to the State at an increased tax burden of fifteen and one-half cents per capita (one dish of ice cream for each). However, there is little need to consider this question from the standpoint of financial expediency.

The suffering and poverty engendered by disease

appeal so forcibly to our better natures that the cost of remedial measures becomes a secondary consideration, while the interest man now has in the welfare of his fellow man is sufficient incentive for welfare work that is seeking the subjection of preventable disease.

That we have not yet reached the limit of possibilities for the prevention of disease is being constantly demonstrated. A striking example of what may be accomplished has been recently shown by the Metropolitan Life Insurance Company at Thetford Mines, in Canada, where, beginning in 1921, by a systematic and well-planned campaign by a staff of nurses to lessen infant mortality, the death rate for infants was lowered over 50 per cent in two years.

Notwithstanding all that has been accomplished, it is estimated that the loss from preventable disease in the United States still reaches the enormous total of three billion dollars annually, while that from lost wages due to illness alone is greater than the total value of the wheat crop of this country. So there is plenty of work left and need for self-sacrifice on the part of all who feel that they may lend a helping hand to save a brother or a neighbor from impending danger, and in thus helping others, incidentally help themselves.

That the death rate from tuberculosis in this state is now only slightly more than one-half; of infants under one year about two-fifths; that from diphtheria only one-third; from scarlet fever only one-sixth; and typhoid fever about one-twenty-eighth that of a few years ago is surely enough reward for the few hours spent each month by volunteers enlisted in the work of public health and sanitation in Minnesota.

So we gather here today to pledge our aid in this good cause, sharing one with another and with the splendid pioneers of bygone days the credit of having made Minnesota one of the healthiest states of this Union.

APPARENT DEFORMITIES OF THE PILLARS OF THE FAUCES, SEEN AFTER AN IDEAL TONSILLECTOMY*

F. J. PRATT, M.D., F.A.C.S.

Assistant Professor of Ophthalmology and
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University of Minnesota

Minneapolis

This paper deals only with throats that have had tonsillectomies where no muscle tissue has been removed.

The cause of apparent deformities in the pillars of the fauces is due to anatomical variations in their structure.

"The palato-glossus is a small, fleshy fasciculus, narrower in the middle than at either extremity, forming, with the mucous membrane covering its surface, the anterior pillar of the soft palate. It arises from the anterior surface of the soft palate on each side of the uvula, and, passing downwards, forwards and outwards in front of the tonsil, is inserted into the side and dorsum of the tongue, where it blends with the fibres of the stylo-glossus muscle. In the soft palate, the fibres of this muscle are continuous with those of the muscle of the opposite side.



Fig. 1. Normal pillars.

The palato-pharyngeus is a long, fleshy fasciculus, narrower in the middle than at either extremity, forming, with the mucous membrane covering its surface, the posterior pillar of the soft palate. It arises from the soft palate by an expanded fas-

ciculus, which is divided into two parts by the levator palati. The anterior fasciculus, the thicker, lies in the soft palate between the levator and tensor, and joins in the middle line the corresponding

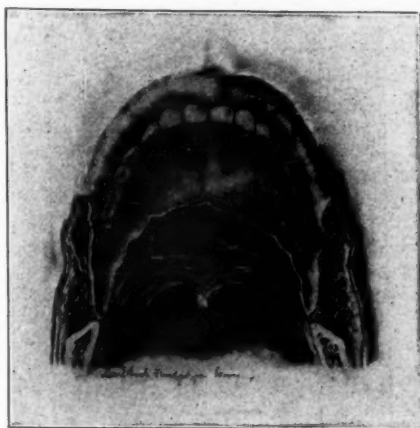


Fig. 2. Muscles of the pillars.

part of the opposite muscle. The posterior fasciculus lies in contact with the mucous membrane, and also joins with the corresponding muscle in the middle line, passing outwards and downwards behind the tonsil. The palato-pharyngeus joins the stylo-pharyngeus, and is inserted with that muscle into the posterior border of the thyroid cartilage, some of its fibres being lost on the side of the pharynx, and others passing across the middle line posteriorly, to decussate with the muscle of the opposite side."

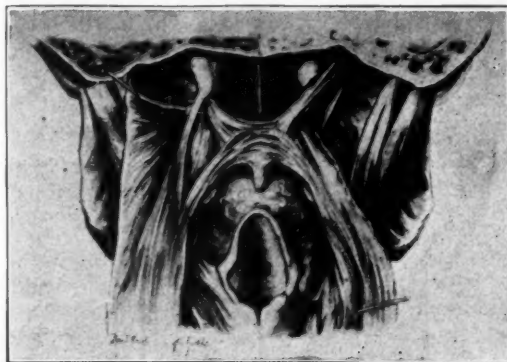


Fig. 3. Muscles of the Posterior pillars from behind.

An ideal throat has large muscular pillars, the anterior pillars about one-third the size of the posterior pillars.

*Presented before the annual meeting of Minnesota State Medical Association, St. Paul, October, 1923.

The variations are as follows:

1. Large muscular posterior pillars and thin anterior pillars. This is the most common variation. (Fig. 4.)



Fig. 4

2. Large muscular anterior pillars and small posterior pillars. The anterior pillars stand out well; the small posterior behind the anterior, at first glance, look as though they had been removed. (Fig. 5.)

3. A large muscular posterior pillar and a thin anterior pillar on one side and a large muscular anterior pillar and a thin posterior pillar on the other. (Fig. 6.)

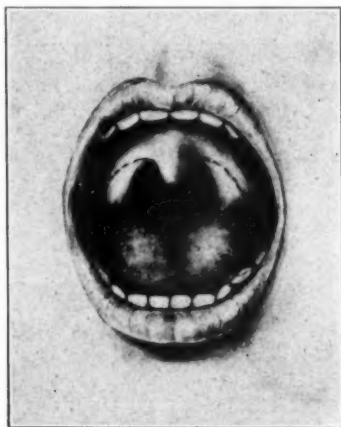


Fig. 5

4. Fairly large anterior and posterior pillars, but the posterior pillars one-third to one-half way

down blend into the muscular wall of the pharynx. (Fig. 7.)

5. The pillars on one side normal, but on the other side the posterior pillar one-third to one-half way down blends into the muscular wall of the pharynx. (Fig. 8.)

6. Both anterior and posterior pillars narrow and contain a small amount of muscle tissue. (Fig. 9.)

7. The pillars on one side normal, but on the other side the posterior pillar comes off high up behind the anterior pillar. (Fig. 10.)

The ideal pillars are generally found in the patients with large throats and tonsils of medium size.

The pillars in the throats of patients with large tonsils tend to be small; whether the large tonsils cause small pillars, or small pillars large tonsils, I am unable to say.



Fig. 6

Thin pillars or pillars with small amount of muscle tissue tend to collapse after a tonsillectomy, as there is not enough muscle tissue to hold them out, but plainly show if the patient gags.

A careful examination of a throat before a tonsillectomy will tell you just the kind of a throat to expect after a tonsillectomy, providing the muscle tissue has not been injured during the operation.

DISCUSSION

WILLIAM R. MURRAY, Minneapolis: The anatomical description of the muscles which form the faucial pillars and the illustrations shown by Dr. Pratt demonstrate very nicely the variations which may occur in these structures, and when these anatomical differences exist, we expect to get a

somewhat different post-operative appearance in the fauces after tonsillectomy than we would have if the muscular structures composing the pillars were of the usual development and symmetrical on both sides of the fauces.

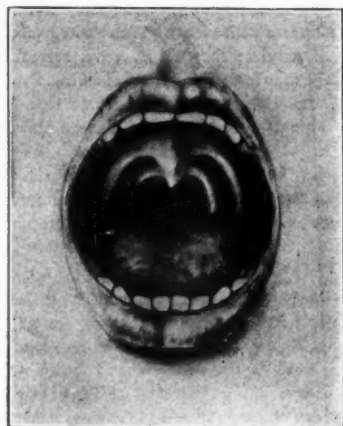


Fig. 7

I believe that these differences in the muscular development are more apparent than real in so far as they affect the ultimate appearance of the fauces after a tonsillectomy, and the appearance of the pillars and fauces immediately after operation is not always an indication of the ultimate appearance six months after operation.

There are other anatomical factors that influence the post-operative results of tonsillectomy. The sinus tonsillar is may be exceedingly deep and may extend high up into the soft palati above the junction of the anterior and posterior pillars and the upper lobe of one tonsil may extend

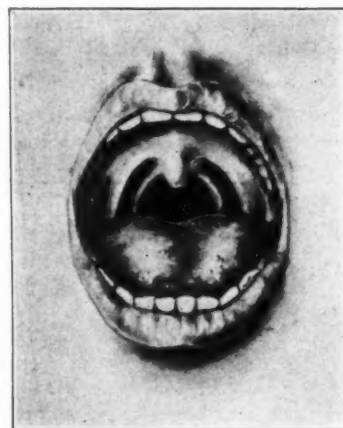


Fig. 8

much higher than the upper lobe of the opposite tonsil, in which case there is an asymmetry in the appearance of the pillars immediately after operation. This, however, is not

a deformity and later after the healing process is complete this asymmetry usually disappears.

Sometimes the anterior and posterior pillars are adherent to the tonsils so that in separating them from the tonsil a denuded surface is present on the posterior surface of the anterior pillar and the anterior surface of the posterior pillar. During the healing process the anterior and posterior pillars become drawn together and in some cases almost obliterated. This does not necessarily mean a deformity and gives no unfavorable results other than a temporary feeling of tenseness or drawing sensation which disappears.

The extent to which the external surface of the tonsil is attached to the muscular bed of the fossa may influence to an extent the post-operative appearance of the fauces. Usually the upper half of the tonsil is very loosely attached to the sinus tonsillar. The area to which the tonsil is firmly attached to the fossa varies greatly and sometimes extends to the borders of the anterior and posterior pillars. In these cases there will be greater obliteration of the fossa and pillars following the healing of the wound.

The presence of a well developed plica triangularis may influence the post-operative appearance, as the plica is removed with the tonsil.



Fig. 9

The immediate, and sometimes the final, post-operative appearance, then, may be influenced by anatomical and pathological conditions that may be present previous to operation and the so-called apparent deformities referred to by Dr. Pratt are not deformities, and cause no unfavorable symptoms, if no operative injury has been done to surrounding muscle tissue.

DR. CARL L. LARSEN, St. Paul: I am pleased that Dr. Pratt used the word apparent because a great many of the deformities are more apparent than real.

While a perfectly performed operation is our aim and undoubtedly leaves the most ideal throat, I am convinced that there are many exceptions.

If the sinus tonsillar is deep and the tonsillar root extensive, the surface denuded by the removal of the tonsil

will include nearly the whole of the sinus even to the edge of the pillars. Here contraction of the cicatrix may pull the pillars so closely together that they appear to be and often are adherent.

There is actually no deformity but the pillars do not stand out with a distinct gutter between them, which is the ideal end result.



Fig. 10

Difference in the size of the tonsils, difference in the attachment, the arch of the palate or the tonsils being higher on one side than on the other, are conditions that frequently account for the difference in appearances of the

two sides and consequent asymmetry which is not the ideal looking throat.

Infection, too, plays an important part. The more infection the greater the cicatricial contraction and the greater tendency to agglutination of the denuded surfaces.

I am convinced that after tonsillectomy nothing should be done to interfere with nature's attempt at repair. I doubt the efficacy of gargles; they do no good, are often painful and frequently interfere with prompt healing.

I do not believe we can always tell beforehand just what kind of a throat we are going to have following tonsillectomy. The separation of the anterior pillar by sharp dissection with knife, scissors or Sluder, the remaining dissection and removal of the tonsil with a minimum amount of traumatism is undoubtedly the ideal operation, but unfortunately, no matter how skillfully performed, the ideal looking throat is not always attained.

DR. F. J. PRATT, Minneapolis (closing): It is impossible to tell exactly what kind of throat you are going to get because some people scar more than others, and naturally there will be more contraction. What I meant was that we can get an idea of about the kind of throat we are going to have by the amount of muscle tissue there is in the pillars. The thing that brought this paper to my mind was: Why was it that after doing a tonsillectomy apparently the same way every time, the throats were not all ideal? Some had what we call nice normal throats and others had not. That led me to make a study of these cases, and I have been keeping track of them for a number of years. I have seen all these different variations, and I came to the conclusion that they were anatomical. There have been plenty of papers on deformities of the throat but nothing has been said about anatomical variations.

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APRIL, 1924

No. 4

EDITORIAL

Periodic Health Examinations

The human body is a wonderful machine, but how woefully mistreated through carelessness and ignorance. There were times when a man would deliberately mutilate his body in the name of religion. Ideas, fortunately, have changed. It is being more and more realized that a healthy body is more likely to result in a better functioning brain and a happier individual.

The Britisher holds his athletic games indispensable. Such Americans as Roosevelt, Taft and Coolidge have realized the necessity of taking time out of a crowded day for attention to physical needs. Cyrus Curtis of Curtis Publishing Company fame is a good example of a busy man not realizing the importance of taking care of himself until he was turned down for life insurance some twenty years ago. He is also a good example of

how life may be extended and be made even more efficient by devoting a little attention to bodily needs.

The purpose of periodic health examinations is not only to discover signs of early disease, which may be amenable to treatment, but to detect errors in habits, which are either interfering with good health or are likely to cause trouble in the future. A business man was once heard to remark that in his opinion if the average young man was not a success at his occupation, whatever it might be, there was generally some bad habit to account for it. This is the sort of thing that a periodic health examination should ferret out and it is apparent that such an examination must of necessity be quite different from the ordinary consultation. It is quite evident that the idea of such examinations must be sold to the profession if they are to amount to anything. Perhaps the best way of convincing any "doubting Thomas" would be to have him make such examinations. It would not be long before he would be impressed with the number of individuals with diseased tonsils, carious or abscessed teeth, whose chest and waist measurements should be reversed, or who are using coffee or tobacco to excess.

The examination of supposedly healthy individuals is not entirely new. It is a common saying that the Chinese physician is paid to keep his patient well. Infants in infant welfare stations, school children and college students on entering an institution, workers at industrial establishments, life insurance applicants and policyholders commonly go through a more or less thorough overhauling. Many unsuspected abnormal conditions have been detected by such examinations.

The present move for periodic examinations originated among the laity, which is as it should be. Numerous organizations, some supervised by non-professional men, have sprung up to satisfy and augment the demand. The Life Extension Institute of New York, headed by Dr. Eugene Lyman Fiske, is the largest and best known organization of this sort. Begun with a humanitarian motive, it has proven its worth in dollars and cents to many insurance companies and bids fair to continue its already rapid growth.

The National Health Council, composed of a number of nation-wide associations such as the Red Cross, Public Health Service, National Tubercu-

losis Association, Woman's Foundation for Health, et cetera, is carrying on a nation-wide campaign for health examinations and has adopted the slogan "Have a Health Examination on Your Birthday."

Realizing the growing demand for these examinations, our national organization gave the idea its approval at San Francisco last summer, and the Council on Health and Public Instruction of the American Medical Association has prepared an outline form for use by physicians. In the A. M. A. Journal of May 12, 1923, the form is thoroughly explained in an article by Dr. Haven Emerson. Reprints of this article and examination forms may be obtained from the A. M. A. headquarters.

It has been suggested that each county society take up the proposition of periodic health examinations at one of its meetings. A thorough discussion of the subject based on Dr. Emerson's report should clear the atmosphere. Whether public announcement that the local physicians are prepared to give these examinations is made or not should be left to each county society to decide.

It is unquestionably desirable to have some form to follow to insure a methodical and thorough examination. The work will be greatly facilitated if the applicant makes out his portion of the blank in advance of the physical examination, which should preferably be by appointment. The A. M. A. form insures thoroughness, which is fully as important in such examinations where there is often no clue offered to existing trouble as in ordinary consultations. Examinations of supposedly well individuals are, too, quite different in the matter of advice to be given regarding personal hygiene.

The medical advisor and particularly the general practitioner is the logical one to conduct these periodic health examinations. The examiner himself is in a far better position after personally examining and discussing the patient's habits to give valuable advice than anyone, even a medical man, in a distant city, providing, however, the examiner is in sympathy with the procedure and takes the trouble to give this sort of work the necessary thought.

The only reason these examinations are being carried on by anyone other than the family physician is because we have been slow to meet the situation. The demand exists. Are we as a profession going to meet it?

Doctor Amos W. Abbott—A Tribute

It is characteristic of every community to present certain outstanding figures. There is always to be found a minority who, because of special attributes, reach heights which are unattainable by the great majority of individuals. The medical profession is richly endowed with these outstanding figures. A favorable heritage plus a good fundamental education and an unceasing effort to obtain and apply knowledge are the essential assets which make it possible for certain individuals to achieve well-earned distinction.

Too often great men are unappreciated in their respective communities until after they have passed on. Too often, bouquets, both in a literal as well as a figurative sense, are withheld from those whose achievements merit the appreciation of those about them until they are no longer with us. Too often, do we fail to make known the fact that we are cognizant of the exceptional worth of outstanding personalities until after they have gone to their reward, when the knowledge of the esteem in which they were held can be transmitted to their survivors only.

Only occasionally does the realization of the honesty, integrity, character, personality and achievements of an individual present itself with such exceptional force to those who are familiar with his accomplishments that the offering of a befitting tribute is made while he is still among us and in a position to realize the esteem in which he is held by his confrères.

A delightful and unusual example of spontaneity in offering a well-deserved tribute took place at the Minneapolis Club on Saturday evening, March 1st, when an assemblage of about one hundred friends of Dr. Amos W. Abbott gathered to pay a tribute to this well-known surgeon upon the occasion of his fifty-fifth anniversary in the practice of medicine. At a dinner given in his honor his friends vied with each other in eulogizing him and showering him with felicitations. The fact that Dr. Abbott is still in possession of excellent health and virility with mental facilities as acute as those of the average man of fifty added zest to the occasion. His record in the Civil War, in which he took part while not yet of legal age, his achievements as a teacher in the medical school, his contributions to medical science, the indelible impression he has made upon the practice of medicine in the Northwest, his uni-

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versal kindness, encouragement and direction of the younger members of the medical profession, and his loyalty as an American citizen, were dwelt upon by the speakers from various walks of life in a manner befitting his rank. Dr. Abbott and his family were made to realize the pinnacle upon which this nestor of medicine and surgery stands in this community.

With the modesty and diffidence which are characteristic of Dr. Abbott, he returned his thanks for the many words of appreciation offered by those present and in addition credited Mrs. Abbott and his faithful nurse, Miss Holmes, and others who have been associated with him, with being responsible for any success he might have attained. He further paid a glowing tribute to Messrs. O. C. Wyman, T. B. Janney and Wm. F. Dunwoody, the gentlemen who had so whole-heartedly donated large sums of money, thus making possible the establishment of the magnificent institution of which he is the head.

MINNESOTA MEDICINE and all of Dr. Abbott's acquaintances appreciate the fact that were it not for his remarkable achievements, his staunch and conscientious observance of the Golden Rule, combined with his sterling qualities and personality, these influential citizens would not have been inspired to donate so generously for such a worthy cause. We know that his example has been and will be a lesson to all other members of the medical profession and we hope that other citizens who are financially able to do so will see the necessity and righteousness of following the example of Messrs. Wyman, Janney and Dunwoody.

We take great pleasure in joining with Dr. Abbott's friends and admirers and adding our mite. Though not in measurable or tangible form—yet we would have him feel it is our sincerest wish to bestow upon him the greatest endowment within our power—our appreciation and love.

Minneapolis Health Exposition

In keeping with the idea that prevention of disease is far better than cure, the Hennepin County Medical Society will launch, from May 3 to 10, 1924, the first Health Exposition in this part of the country. Only five other cities have so far held such expositions. The medical society is the logical agency to manage such an activity, although numerous other civic and social organizations will take part.

The Exposition has chosen for its motto "Live a Little Longer." Education is the main factor in accomplishing this result. Prevention of unnecessary sickness, care of the sick, sanitation, ventilation, social science and kindred topics will be emphasized. There will be elaborate displays of all kinds, most of which will deal with medicine, surgery, dentistry, pharmacy, safety methods and other topics of interest to the general public. Lectures will be enlivened by entertainment features and motion pictures.

Eminent scientists from various parts of the country will be invited to Minneapolis for the week. The simultaneous holding of Minneapolis Clinic Week (May 6 to 9) should afford a double-header attraction for physicians and public alike.

COMMUNICATIONS

St. Paul, Minn.,
March 10, 1924.

TO THE EDITOR:

In compliance with our conversation of the other day, I am writing you as follows:

SIMPLE GOITER PREVENTION

Minnesota is in the goiter belt of North America. The prevention of simple goiter is of import to every person in the state and of special interest to the medical profession.

The story of the use of iodine as a preventative in the human has been most interestingly told by Marine and Kimball and the agricultural experiment stations of the Northwest have told the story in animal husbandry.

By addressing the Surgeon-General, United States Public Health Service, two interesting reports upon this subject may be obtained—the "Prevention of Goiter," Reprint No. 832 from the Public Health Reports, April 27th, 1923, and the Public Health Reports of January 11th, 1924.

We have for some time been trying to obtain some definite statistics as to the prevalence of simple goiter in Minnesota. Not being able to find any statistics already compiled, a survey was made of the sixth, seventh and eighth grades, corresponding to the ages of eleven to fifteen, of twenty-nine public schools in St. Paul.

We followed the classifications of Marine and Kimball of "Slightly enlarged, moderately enlarged and enlarged," slightly enlarged indicating the "palpable only" type. Our five medical inspectors were sent out to make this survey, one man doing a school with a nurse assisting. The findings were so startling that we had other medical inspectors go over the same schools to verify the results (they were not previously notified that the building had been surveyed). The second survey confirmed that of the first, the greatest difference being only five per cent.

Twenty-nine grade schools and two high schools were surveyed, the average findings being as follows:

| GRADE SCHOOLS | | |
|---------------|--------------------|-----------------------------|
| | Number examined | With enlarged thyroid |
| Girls | 2,608 | 73% |
| Boys | 2,559 | 54% |

| CLASSIFIED AS TO DEGREE OF ENLARGEMENT | | |
|--|-------|------|
| | Girls | Boys |
| Slightly enlarged | 41% | 45% |
| Moderately enlarged | 26% | 11% |
| Enlarged | 6% | 2% |

These figures seemed so astounding to us that we were in doubt whether to believe them. Of course, this classification is of gross character, but nevertheless valuable. As Marine and Kimball state, about 75 per cent respond to prophylactic iodine treatment.

HIGH SCHOOLS

In Humboldt High School, in a group of 235 girls, 73 per cent had enlargement and in a group of 150 boys, 58 per cent had enlargement.

In Central High School, in a group of 134 freshman girls, 78 per cent had enlargement and in 127 freshman boys, 45 per cent had enlargement.

| CLASSIFIED AS TO DEGREE OF ENLARGEMENT | | |
|--|-------|------|
| | Girls | Boys |
| Slightly enlarged | 39% | 44% |
| Moderately enlarged | 34% | 1% |
| Enlarged | 5% | 0 |

Second in point of interest to the large average percentage of enlargement of the thyroid, is the variable distribution throughout our city. For instance, in our First Ward, the average incidence in girls is about 90 per cent; in the Eighth Ward the school average is 51 per cent; in a school in the Tenth Ward 47 per cent and another school in the Tenth Ward 46 per cent. There were many other variations in distributions of this character and a study is being attempted to analyze these differences. It is to be remembered that the same physician surveying a high percentage school also reported low percentage schools.

OTHER CITIES

We were able lately to obtain a compilation from the Minnesota State Board of Health of surveys made in five of the smaller cities, namely, Eveleth, Gilbert, Hibbing, Grand Marais and St. Peter. The total findings were as follows:

| | |
|----------------------------------|-------|
| Girls with enlarged thyroid..... | 70.4% |
| Boys with enlarged thyroid..... | 42.6% |

In one place children below the age of ten years were surveyed and, of course, this brought down the total average.

CAUSES

The great variation in the prevalence of goiter in different districts of the city is difficult to analyze. The economic

conditions are a factor, as well as the national food habits and the local environment.

We believe that diet is the principal factor. In the First Ward, we have a Swedish population that is extremely local in its habits. For several generations they have lived in this locality. The food habits have changed since leaving the Scandinavian peninsula. Our investigation shows that the principal diet consists of coffee, bread, cake, meat and potatoes. These foods lack the iodine content and may be one reason why they have a large percentage of thyroid enlargement.

In districts where economic conditions prohibit the purchase of vegetables throughout the year, and where the districts are so congested that gardens are not grown, we also find a large percentage of thyroid enlargement.

In other districts where economic conditions are not so severe and a larger amount of southern grown vegetables are purchased with a large iodine content, we find less enlargement of the thyroid.

The possibility of atmospheric iodine must be considered. McClendon states that the burning of coal disseminates iodine in the atmosphere.

FUNCTION OF IODINE

Marine explains the physiological action of iodine as follows: "Starting with the normal thyroid there is a decrease in the iodine store and a corresponding decrease in the stainable colloid. If the iodine store falls below 1 mg. per gram of dried gland, active hyperplasia begins. If the iodine deficiency is not met, the thyroid glands will go on to cellular degeneration and atrophy, or where the iodine deficiency is met, it returns to the colloid or resting stage. This is the nearest to normal that an active hyperplastic gland can come and function normally.

"Experiments show that the thyroid will start to enlarge as soon as the iodine content gets below one-tenth of one per cent of the total amount of dried gland tissue. When the iodine content of the thyroid gland in pregnant animals is deficient, the young are born with goiters, while on the other hand this tendency toward goiter formation in the young could be prevented by maintaining a normal iodine content in the mother's thyroid. (1) Iodine is necessary for the normal function. (2) The iodine content varies inversely with the degree of hyperplasia. (3) The percentage of iodine present in individual thyroids is variable, but there is quite constant minimum percentage which is necessary for the maintenance of normal or colloid gland structure. If the iodine content falls below one-tenth of one per cent, active hyperplasia begins. Also, iodine is necessary for the physiological activity of the thyroid secretion."

Simple goiter or the simple enlargement of the thyroid gland is common in certain portions of the globe. The knowledge of the simplicity with which the majority of thyroid disarrangements could be prevented is so important that everybody must know what to do and how it must be done.

Goiter is one of the most insidious diseases which attack man and animals and the easiest to prevent.

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Under the classification of simple goiter, we now include all those thyroid enlargements in man and animals which were formerly designated as endemic, epidemic, sporadic and physiologic or adolescent goiter.

Practically all of the preventive work has been confined to the adolescent age. There is little, if any, danger of aggravating toxic thyroid types with the small amount of iodine administered.

It must be remembered that the purpose of the administration of iodine among the adolescent is for prevention and not treatment. Those having a thyroid that requires treatment should place themselves in charge of a physician. We do not believe in advising adults to take iodine for enlarged thyroid unless they are under observation of a physician.

WATER SUPPLY

Iodizing the water is an expensive procedure, due to the large amount of city water supply for other than drinking purposes. There is a possibility of iodized water aggravating the toxic goiter; there is also the danger of iodized water interfering with certain commercial enterprises,—such as bakeries, laundries, etc.; in some places this fact has caused considerable opposition.

The States of Wisconsin, Montana and Michigan, through their agricultural departments, issue a vast amount of printed matter for the prevention of thyroid difficulties in fish and livestock. These publications are usually issued under the title of "Hairlessness" and "Goiter" or "Hairless Animals."

Early in 1918, in Switzerland, long known to be the most goitrous country in the world, a campaign to eradicate goiter was begun in the schools of Zurich under the direction of Dr. R. Klinger. It was found that in some of the schools 100 per cent of the children were goitrous.

The governing authorities of the different cantons of Switzerland realized how readily and easily the incidence of goiter could be controlled. Measures were adopted for an energetic campaign to stamp goiter out of the country. The Canton of St. Gall, Berne and Zurich have for more than three years given treatment to the school children with striking results. The figures show that before the treatment was inaugurated goiter occurred in 61 to 97 per cent of all children. After treatment, the percentage had fallen to 27.5 per cent.

CONCLUSIONS

1. The importance of local surveys in Minnesota has been shown and more should be made.
2. Enlarged thyroid is prevalent among the adolescent and radical steps towards its prevention should be taken at once.
3. The most practical and effective method is the weekly administering by mouth of small quantities of iodine preparations.
4. Simple goiter is easy of diagnosis and is the easiest known disease to prevent.

Very truly yours,

E. A. MEYERDING, M.D.,
Director of Hygiene.

La Crosse, Wis., Feb. 9, 1924.

MINNESOTA MEDICINE.

Gentlemen:

Have read with much interest your editorial concerning the optometrists and their professional standards, reprinted in the *Optometric Weekly*. The editorial is well handled. But it reminds me of the Minnesota Swede that poked fun at the Wisconsin German because the Wisconsin German spoke broken English, and we laughed at the broken English of the Swede, and he got mad.

Reform should begin in one's home before we attempt to go into the world and reform the world. The Jew says that the Golden Rule is a good rule and ought to be obeyed, but he is a Jew and does not believe in Christ.

If I interpreted the editorial, the mind that wrote it had the purpose of having us believe that *the* mind was one mind in authority.

When the editorial was written the writer did not have before him the fact and truth that physicians and surgeons, with the title M.D. added, run cards in their local papers that read like the ones I have inclosed. So may we ask, if it is these men that the editorial refers to when it speaks of the medical oculist. Are these physicians oculists?

Suppose members of the medical profession began in their own ranks and reformed themselves and made it impossible for any doctor with the title M.D. to assume the title oculist until he had earned that which you propose the optometrist should earn before he examines eyes and fits glasses.

Is not the correspondence between the physician and the editor of a medical journal significant as it relates to the reform that you have proposed for another? Of course many laymen do not know that such things exist among the medical profession.

Nearly every country doctor of medicine has a trial case today, and when he cannot find a surgical job he gets out the trial case and sells them glasses. Ask any oculist what he thinks of it.

The right to confer the title doctor rests with the people. A charter is granted any college to confer its titles by the people. People have addressed me as "doctor" for years and years, and only lately have I begun to use it in my advertising. And everyone believes in advertising. Did you ever know of a doctor of medicine that refused to permit all the free advertising that he could get, that would help him become a Will or Charles Mayo?

The optometrist will be faithful to the people who employ him or the people will destroy the optometrist. No other organization can destroy the optometrist who does not practice medicine, and the courts of the country, that we honor, have rendered a decision that any man, doctor of medicine or otherwise, who examines eyes and fits glasses is not practicing medicine.

When I cannot produce normal vision for a person, I recommend that he go to his family physician, and when I note diseases of any kind I recommend that the person go to his family doctor. Then what happens in lots of cases? The person has listened to the family physician recommend that when the person gets his eyes fitted to glasses, he should go to the oculist and not back to the

optometrist. And the Jew says the Golden Rule is a good rule for Christians, but he is a Jew.

If an optometrist makes a mistake it is different than when a doctor of medicine makes a mistake.

The writer has been examining eyes and fitting glasses for over twenty years, and I offer and do refund money when I fail. Ever hear of a doctor of medicine refunding money when he fails? And I am just an ordinary optometrist, because I have not a good press agent or the money to hire one, but the people, whom I have learned to trust, will cleave to that which is right.

I hope that the doctors of medicine will read what is printed in the editorial and apply it to themselves, and I am glad the optometrists have the same privilege.

Very truly yours,

H. CLAY EVENSON.

P. S.—I know one of the finest surgeons of our city, who will fit you with glasses, and he does not assume the title oculist.

Editor's note: The editorial referred to appeared in the October, 1923, number of MINNESOTA MEDICINE. It is not our purpose to enter into a debate on this subject, but the above viewpoint of an optometrist is interesting and hits some vulnerable spots in the medical profession. For anyone to hold that all M.D.s are beyond criticism and all optometrists inefficient would be absurd. What is more, it is doubtless true that a well trained optometrist can fit a pair of glasses better than the average M.D. at graduation. There can be no argument, however, on the point that the medical graduate has a firmer foundation to build upon than the optometrist.

Obviously the weak link in our present stand in the matter of fitting glasses is the casual sort of work done by some of our regular doctors. Even at that, however, no one could say that a lot of jewelers and bungling opticians should be allowed to fit glasses, chiefly in order to sell them.

If the development of optometry were the result of a demand for a specialist in fitting glasses in a sparsely settled district where the M.D. was more occupied in the pursuit of the various other medical activities, we might feel differently about the situation. On the contrary, optometry has developed for the most part in the thickly settled districts where there is no paucity of oculists. The rank and file of optometrists advertise; the advertising oculist is the exception and as a rule is classed by his fellow practitioners as an outsider. Doubtless some M.D.s have felt forced to advertise by the advent of numerous advertising "specialists," just as the allies were forced to take up gas warfare, although not approving of it.

As intimated in the editorial, the optometrist is developing a professional sense but the medical profession has a twenty years' lead over the present optometrists. If the optometrists are in dead earnest, let them acquire all the current knowledge in existence pertaining to all phases of science having to do with the life work they have chosen. The public demands thorough education for those entrusted with the care of the teeth. Surely our eyes are fully as valuable as our teeth.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNEAPOLIS CLINIC WEEK—1924

The days for Minneapolis Clinic Week are May 6, 7, 8 and 9.

The first two days, May 6 and 7, will be devoted to dry clinics entirely. The following days, May 8 and 9, will be devoted to clinics at hospitals where perhaps some of the patients that are exhibited at the dry clinics will be operated in the wet clinics; or medical cases which are shown there will be demonstrated later perhaps by more suitable methods.

There has been some question as to the meaning of "dry clinics," and the plan of the Committee in charge is to have the entire attendance congregated in one meeting place (that to be selected later) where all the men may see the ambulatory or bed clinics that will be given on a raised platform and will be demonstrated by men who have been chosen for this special line of work. We do this with the expectation that many may get more from a dry clinic under these circumstances than a few may get from an operative or bedside clinic at a hospital.

Any man from outside the Twin Cities may send in his patient for a dry clinic demonstration if he so chooses.

Minneapolis Clinic Week is to be closely affiliated with the Minneapolis Health Exposition which will be in operation from May 3-12 at the Armory Building in Minneapolis, and where several phases of public health work, educational work related to public health measures, and commercial exhibits which are related to both, will be carried on.

It is expected in the Health Exposition that a large number of men will participate in the demonstrations at the various booths and during the clinical examinations which are to be given at the same time.

The Annual Banquet given by the Hennepin County Medical Society will take place on the evening of Wednesday, May 7th, at the Radisson Hotel, which will also be the headquarters for Minneapolis Clinic Week.

UNIVERSITY SHORT COURSE

The attention of the profession is called to the change in the plans for the short courses in postgraduate work to be conducted by the University this summer.

This year the courses will be condensed to two weeks instead of four in the hope that a larger number will enroll and take the full course.

The course in Medicine and Surgery will run for two weeks beginning May 26, 1924. The date previously announced in a circular postal card has been advanced to May 26, so as not to interfere with the American Medical Association meeting in Chicago, which begins June 9.

The course in Pediatrics and Obstetrics will be held in September, 1924.

The University has conducted these courses for the past four summers for a period of four weeks in the month of May. The course has been a general one in the past and the average attendance has been about thirty. Shortening the course and dividing it in two will, it is hoped, prove more practical to those interested.

TRI-STATE DISTRICT MEDICAL ASSOCIATION

Interstate Post-Graduate Clinic Tour to Canada, British Isles, and Paris in 1925 is now being arranged under the supervision of the Managing Director's office of the Tri-State District Medical Association. The time for leaving will be about the middle of May.

The tour will consume, approximately, two months' time and the total cost from Chicago and back to Chicago again will be less than \$1,000.00. This will include all clinic arrangements and admissions and all traveling expenses, except meals on Pullmans in America and tips on the ocean steamer. First-class hotels will be used everywhere and the ocean passage will be on the largest and finest of the new one-cabin ships.

Clinics are being arranged in Dublin, Belfast, Liverpool, Manchester, Leeds, Edinburgh, Glasgow, Newcastle, London and Paris and other points of clinical interest. The clinics will be conducted by the leading clinicians of these cities. The opportunity will be given, subsequently, to visit the clinic centers in other parts of Europe.

This tour is open to members of the profession who are in good standing in their state or provincial societies and their families and friends.

Sight-seeing programs will be arranged practically every day abroad, including the most scenic part of the countries visited, without extra cost.

On account of the great demand for reservations, applications should be made as early as possible to Dr. William B. Peck, Managing Director, Freeport, Illinois. Preference in the assignment of hotel and steamship accommodations will follow the order in which the applications are received.

AMERICAN DERMATOLOGICAL ASSOCIATION

The next annual meeting of the American Dermatological Association will be held in Minneapolis, June 5, 6 and 7, 1924, with headquarters at the New Lafayette club, where all papers will be given. A skin clinic will be given at the University Hospital in connection with the regular meetings.

Arrangements for the meeting are being made by the local members of the Association, Dr. John Butler, Dr. S. E. Sweitzer, Dr. Charles Freeman and Dr. H. G. Irvine, who, as a member of the Council, is acting as chairman.

AMERICAN SOCIETY OF CLINICAL SURGERY

Announcement has been received of the semi-annual meeting of the American Society of Clinical Surgery, which is to be held in Rochester, Minnesota, June 6 and 7, 1924.

RED RIVER VALLEY MEDICAL SOCIETY

At the annual meeting of the Red River Valley Medical Society which was held in Crookston in January, the following officers were elected for the coming year: President, Dr. W. H. Hollands, Fisher; vice president, Dr. Arthur Kahala, Crookston; secretary-treasurer, Dr. M. O. Oppegaard, Crookston.

STATE MEDICAL MEETING

The annual meeting of the State Medical Association will take place October 8-10, 1924, at St. Cloud. The program committee consisting of the chairman and secretary of the Surgical Section, Dr. A. C. Strachauer, Minneapolis, and Dr. V. C. Hunt, Rochester, the chairman and secretary of the Medical Section, Dr. E. L. Tuohy, Duluth, and Dr. C. N. Hensel, St. Paul, and the secretary of the Association, had its first meeting February 13. The various problems in the arrangement of a comprehensive program were discussed. It was decided to arrange a program similar to previous state medical programs, affording an opportunity for members of the Association to present subjects in which they are particularly interested and which will be of interest to the members. Members are invited to send in to the secretary of the Association, 402 Guardian Life Bldg., St. Paul, the titles of subjects they desire to present. It will of course be incumbent on the committee to pick and choose in order to make up a well balanced program. Titles must be in the hands of the secretary by April 15. Prompt notification of acceptance or rejection will be made about May 15.

THE MEDICAL FORUM

The Medical Forum of St. Paul held its regular monthly meeting Wednesday evening, March 5, 1924. After a dinner at the Saint Paul Hotel the following program was given:

1. Case Report. Pyo-nephrosis, treated by ureteral drainage. This interesting case was fully presented by Dr. E. H. Norris, who emphasized the possibilities and the success of this method of drainage, where other surgical intervention might be contraindicated. General discussion of the case was opened by Dr. F. E. B. Foley.

2. Practical Electrocardiography, with lantern slide demonstration. This subject was presented by Dr. H. E. Richardson, who emphasized the diagnostic, prognostic, and therapeutic aids given by this instrument of precision, the electrocardiograph, especially in cardiac irregularities and in the myocardial degenerative diseases of middle life. He urged a more general use by the medical profession of the information given by this instrument in the interest of more accuracy in the diagnosis and treatment of diseases of the cardio-vascular system. General discussion of the subject was opened by Dr. E. T. Herrmann.

The next meeting of the Medical Forum will be held at the Saint Paul Hotel, April 2, 1924.

W. R. SHANNON, President.
L. S. YLIVISAKER, Secretary.

OF GENERAL INTEREST

Dr. J. V. Johnson of Duluth has moved to California.

Dr. L. Q. Greeley of Duluth has been doing some postgraduate work at Chicago.

Dr. F. D. Brandenburg, formerly of New Richland, is now located at Crystal Bay.

Dr. and Mrs. D. E. Seashore of Duluth spent the month of February at Miami, Florida.

Dr. T. N. Kittelson of Fergus Falls recently returned from a trip to Mobile, Alabama.

Dr. S. H. Boyer was recently elected president of the Professional Men's Club of Duluth.

Dr. and Mrs. L. D. Huffman, Rochester, are the parents of a daughter born February 11, 1924.

Dr. and Mrs. Tolbert Watson of Albany have returned from a trip through the western states.

Dr. and Mrs. C. E. Lum of Duluth have returned from a month's visit in Los Angeles, California.

Dr. J. W. Ekblad of Duluth spent the month of February at the home of his parents in Kansas.

Dr. M. B. Bonta, Rochester, recently returned from a three weeks' clinical trip to New York and Boston.

Dr. H. B. Grimes of Madelia was re-elected for his third successive term as mayor of Madelia at the 1924 election.

At a recent meeting of the Northwest Pediatric Society, Dr. H. G. Irvine, Minneapolis, gave a paper on "Infantile Eczema."

Dr. W. C. Portmann of Jackson, who is now on the Pacific coast, will return to his practice at Jackson about the middle of April.

Dr. E. J. Pengelly of the Cuyuna Range Hospital, Crosby, is now in Chicago, where he is doing postgraduate work in medicine and surgery.

Dr. W. J. McCarthy of Madelia resigned as president of the local school board at a recent meeting, following twenty years of service on the board.

Plans are being made for the construction of a twenty-five-bed hospital at Morris. The building will be of brick construction and will be fireproof throughout.

Dr. E. W. Fahey, Duluth, has been appointed to succeed the late Dr. E. W. Buckley of St. Paul as supreme physician for all lodges of the Knights of Columbus.

Dr. L. E. Claydon of Red Wing has returned from a two months' visit at his former home in England. While there he visited the principal clinics of England and Scotland.

The contract for the interior finishing of St. Luke's Hospital of Duluth was let March 21st. It is planned to have the building ready for occupancy by the first of next year.

Drs. G. A. Paulson, P. F. Eckman, and M. G. Gillespie, all of whom recently completed their internship at St.

Mary's Hospital of Duluth, have located in that city permanently.

Dr. H. G. Reineke of New Ulm is now located in Villard for the practice of his profession. Dr. Reineke was formerly associated with his father, Dr. George F. Reineke, at New Ulm.

Dr. William H. Barr of Wells has been appointed a member of the State Board of Medical Examiners to succeed Dr. A. F. Schmitt, formerly of Mankato, now of Minneapolis.

Dr. D. W. McDougald, who recently completed a course in postgraduate study in New York, is now located at 400 East Hennepin Ave., Minneapolis, for the practice of his specialty in eye, ear, nose and throat work.

Three new members have been added to the staff of Dr. C. T. Granger of Rochester: Dr. R. W. Allen, specialist in obstetrics; Dr. J. N. Guthrie, ear, nose and throat specialist, and Dr. Clara G. Cook, who is a specialist in the diseases of children.

The Goodhue County Medical Society has endorsed the work of the County Health Association and the Red Wing Visiting Nurses Association in establishing children's clinics. Dr. W. D. Beadie of Cannon Falls will be in charge and one or more local physicians will be associated with him in each city where the clinics are held. The first clinic was held at Red Wing on March 11th and was well attended.

Dr. J. W. Andrews of Mankato has returned from a trip to Florida, where he spent the winter months. Dr. Andrews has sold his interests in the Mankato Clinic, but will retain office room in the Clinic building, where he will be able to meet old friends and patients. Although retiring from active clinical work, Dr. Andrews will continue a private practice. He is numbered among the oldest active practicing physicians in Minnesota.

Dr. E. A. Meyerding resigned as director of hygiene in the St. Paul schools, March 17, to take up his new duties as executive secretary of the Minnesota Public Health Association and the management of the *Northwestern Health Journal*. Dr. Meyerding inaugurated health work in the St. Paul public schools in 1909 with a staff of two, himself and one nurse. The department now numbers eighty-five employees. Dr. Meyerding succeeds Dr. W. F. Wilde as executive secretary of the Minnesota Public Health Association, of which Dr. H. Longstreet Taylor, St. Paul, is president.

New Prague is to have a new Community Hospital through the generosity of Mr. and Mrs. W. L. Harvey, formerly residents of the town. Recently they presented the locality with their handsome residence for conversion into a hospital. The building was thoroughly inspected by a committee, assisted by Dr. L. B. Baldwin, superintendent of the University Hospital, and it was determined that with slight changes, the building will be suitable for hospital purposes. An association has been formed and a sufficient fund is being raised to start the project. The hospital will be run on a cost basis, and it is hoped will be in operation this spring.

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Mr. and Mrs. C. E. Friedrich and Miss Helen Friedrich of Red Wing, Minn., have given \$35,000.00 to the Red Wing Hospital Association to be used for the erection of an addition to the Red Wing Hospital. Mr. and Mrs. Friedrich give \$20,000.00 as a memorial to their son, Edward H. Friedrich, and Miss Friedrich gives \$15,000.00 as a memorial to her mother and to her brother, John H. Friedrich. A large frame building, which was built by Gen. Jennison and later was the original hospital, will be removed to an adjoining lot and remodeled into a nurses' home. The sum necessary for this purpose, about \$5,000.00, will be raised by subscription.

OBITUARY

DR. THEODORE C. LUND

Following an illness of but a week's duration, Dr. Theodore C. Lund of Hutchinson died at his home, Monday, February 25, 1924. Death was due to pneumonia. Dr. Theodore Christian Lund, son of Rev. and Mrs. J. Th. Lund, was born in Minneapolis on December 6, 1891, being 33 years of age at his death. With his parents he lived for a time at Blair, Nebraska, and at Salt Lake City, where he first took up his medical studies. He was graduated from the University of Minnesota medical college in the year 1917. At the outbreak of war he was stationed at a hospital in New York City. He enlisted in the service and was placed on the medical reserve list, but was not called for active duty. He returned to Hutchinson in 1919 and since that time had practiced his chosen profession. In this short time he built up an extensive practice and won a host of friends by his ever congenial and pleasant disposition.

On August 10, 1916, at Brush, Colo., Dr. Lund was united in marriage to Miss Christina Danielson of Brush. To this union were born two children, Jane, age 5, and Ruth, age 2, who together with their mother are left to mourn the loss of a kind husband and devoted father.

Dr. Lund also leaves to mourn his untimely death, his father and mother, Rev. and Mrs. J. Th. Lund, Minneapolis; three sisters, Mrs. Marcus Beck of Blair, Neb.; Mrs. Chris Betker of Hutchinson, and Miss Beulah, besides numerous relatives and friends.

DR. JACOB L. HOFFMAN

Dr. Jacob L. Hoffman, a practicing physician at Henning for the past twelve years, died in Minneapolis at the age of 59 years, February 6, 1924.

Dr. Hoffman was born in the province of Trondhjem, Norway, June 2, 1865. His father was a physician and he sent Jacob at an early age to the Christiania medical college. He graduated with high honors, there being but one other student in his class that ranked higher. Later he went to Berlin and studied for one year. He came to America about 25 years ago, first practicing his profession in Eau Claire, Wis. He went to Elbow Lake, where he practiced several years before coming to Henning 12 years ago. He is survived by a wife and three children; also by his father, mother, four sisters and two brothers, who reside in Norway.

DR. JOHN S. SEELEY

Dr. John S. Seeley, graduate of the University of Michigan, 1876, died March 2, at Faribault, at the age of 71. His first work in Minnesota was at Cordova, Le Sueur County. Since then, for 39 years, he practiced at Faribault.

DR. J. A. McAULIFFE

Dr. J. A. McAuliffe of Duluth died March 23, 1924, at St. Mary's Hospital, where he had been a patient since suffering a stroke of apoplexy nearly two years ago.

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

ABBOTT LABORATORIES:

Butesin Picrate

Butesin Picrate Ointment

PARKE, DAVIS AND CO.

Dibromin

E. L. PATCH CO.:

Patch's Flavored Cod Liver Oil

VITALAIT LABORATORY OF CALIFORNIA:

Vitalait Culture Bacillus Acidophilus

WILSON LABORATORIES:

Epinephrin-Wilson

Epinephrin Powder-Wilson.

Epinephrin Solution, 1:1,000-Wilson

Corpus Luteum-Lederle.—The fresh substance from the corpora lutea of the hog or cow, dried and powdered. For a discussion of the actions and uses of ovary preparations, see New and Non-official Remedies, 1923, p. 210. *Corpus luteum-Lederle* is supplied in the form of 2-grain tablets only. *Lederle Antitoxin Laboratories, New York.*

Corpus Luteum Extract-Lederle.—A sterile solution of those constituents of the corpus luteum which are soluble in water containing sodium chloride 0.85 per cent, sodium citrate 1 per cent and chlorbutanol 0.5 per cent. Each c.c. contains 0.02 gm. of soluble matter in addition to sodium chloride, sodium citrate and chlorbutanol. For a discussion of the actions and uses of ovary preparations, see New and Non-official Remedies, 1923, p. 210. The preparation is marketed in 1 c.c. ampules and in 5 c.c. vials. *Lederle Antitoxin Laboratories, New York.*

Ovarian Residue-Lederle.—The residue from the fresh ovaries of the hog or cow after the ablation of the corpus luteum, dried and powdered. For a discussion of the actions and uses of ovary preparations, see New and Non-official Remedies, 1923, p. 210. *Ovarian residue-Lederle* is supplied in the form of 3-grain tablets only. *Lederle Antitoxin Laboratories, New York.*

Silver Nitrate Solution 1 Per Cent-Lederle.—An aqueous 1 per cent solution of silver nitrate contained in ampules composed of beeswax. The preparation is intended for the prophylaxis of ophthalmia neonatorum. For use, a pin hole is made in the ampule and, after suitable preliminary cleansing of the eye, two drops are placed in each eye of the newborn. *Lederle Antitoxin Laboratories, New York.*

Whole Ovary-Lederle.—Whole ovarian glands of the hog or cow, freed from extraneous matter and dried at or below 38 C. For a discussion of the actions and uses of ovary preparations, see *New and Non-official Remedies*, 1923, p. 210. Whole ovary-Lederle is supplied in the form of 5-grain tablets only. Lederle Antitoxin Laboratories, New York. (*Jour. A. M. A.*, Feb. 2, 1924, p. 391.)

Flumerin-H. W. and D.—Disodium-2-hydroxymercurifluorescein. The disodium salt of 2-hydroxymercurifluorescein. Flumerin-H. W. and D., when injected intravenously, is tolerated by rabbits in doses containing from eight to twenty times the amount of mercury present in the therapeutic dose of other mercurial drugs commonly used. When injected into rabbits with syphilitic lesions, the drug brings about resolution of the lesions without apparent injury to the kidney. When injected intravenously into man in doses of 3 mg. per kg., flumerin has caused the disappearance of spirochetes from primary and secondary syphilitic lesions. Flumerin has brought about resolution of the lesions and in about one-half the cases changed a positive blood Wassermann reaction to negative. In tertiary syphilitic lesions resolution of the lesions with a disappearance of a positive Wassermann was brought about in a majority of cases treated. The dose of flumerin-H. W. and D. is from 0.002 to 0.005 gm. per kg. of body weight injected intravenously in 2 per cent aqueous solution. The drug is marketed in tubes containing respectively 0.15 gm., 0.20 gm., 0.25 gm. and 0.30 gm. Hynson, Westcott and Dunning, Baltimore. (*Jour. A. M. A.*, Feb. 9, 1924, p. 469.)

Epinephrin-Wilson.—A brand of epinephrin-N. N. R. Made from the suprarenal gland. For a discussion of the actions, uses and dosage of epinephrin, see *New and Non-official Remedies*, 1923, p. 112. Epinephrin-Wilson is marketed in the form of epinephrin powder-Wilson (vials containing epinephrin-Wilson, 1 grain) and epinephrin solution, 1:1,000-Wilson (containing epinephrin sulphite equivalent to 1 part epinephrin-Wilson in 1,000 parts of physiological solution of sodium chloride). Wilson Laboratories, Chicago. (*Jour. A. M. A.*, Feb. 23, 1924, p. 531.)

PROPAGANDA FOR REFORM

Immunization Against Typhoid.—Ordinarily typhoid vaccine is administered at intervals of seven days. It is said that if the interval is less than seven days, the immunity may be less than after longer intervals. It is asserted also that the maximum response follows when the intervals between the injections are lengthened to eighteen or twenty days. No definite statement can be made as to what the optimal intervals really are. Immunity after anti-typhoid inoculation is not absolute. Army medical officers express the opinion that immunity from inoculation begins to decline in from two to two and one-half years; but even after four and five years, the typhoid rate of inoculated troops has been estimated at about one-fourth that of uninoculated troops. (*Jour. A. M. A.*, Feb. 2, 1924, p. 411.)

The Absorption of Epinephrin.—Although epinephrin is absorbed from the mucous membranes of the nose, throat, mouth, urethra, vagina and rectum, the effectiveness of such modes of introduction is too uncertain to make them popular. The drug is not absorbed from the gastrointestinal

canal to induce any appreciable effect. Intravenous administration must be used with extreme caution and the manifestations secured are likely to be rather evanescent. The response to intramuscular injection is considerable. There is a widespread belief that the subcutaneous administration of epinephrin causes little effect and that the action is decidedly uncertain. However, the relief which is secured from the hypodermic injection of epinephrin in asthmatic patients is evidence that absorption by this route is rapid and satisfactory. It probably proceeds by lymphatic rather than by blood vascular channels. (*Jour. A. M. A.*, Feb. 9, 1924, p. 473.)

The Insulin Reserve.—It is highly probable, according to R. N. Wilder, that patients with the acute type of diabetes will in a few years lose all native tolerance for glucose, and become completely dependent on insulin. In such cases, 37 units (old standard) of insulin may be required, and in some cases as much as 56 units a day. A partially diabetic patient may suddenly be converted into a totally diabetic patient by infection and, therefore, a month's supply of insulin should be kept on hand. Reginald Fitz and William P. Murphy state that there are two classes of diabetic patients: those to whom insulin is a luxury and those to whom it is a necessity. They hold that the wise physician will conserve the use of insulin to the cases of such diabetic patients as can dispense with it or use only small amounts and will hold it in reserve as an indispensable product, for the patients who require large amounts in order to secure definite results. (*Jour. A. M. A.*, Feb. 9, 1924, p. 473.)

Treatment of Pernicious Anemia.—Arsenic and blood transfusion are the two established forms of therapy in the treatment of pernicious anemia, though neither is curative. Arspenamin in doses of 0.03 to 0.06 gm. intramuscularly at intervals of days or weeks has been found useful in some cases, though it has failed in others. (*Jour. A. M. A.*, Feb. 9, 1924, p. 491.)

Ichthyol and Ichthalbin Omitted from N. N. R.—The Council on Pharmacy and Chemistry publishes a report announcing the omission of Ichthyol and Ichthalbin from New and Non-official Remedies and a report on the therapeutic value of Ichthyol on which the deletion of Ichthyol and Ichthalbin is based. Ichthyol was introduced into dermatology about forty years ago, and it came into wide use during its skillful exploitation. It has been difficult to obtain acceptable evidence concerning the therapeutic value of Ichthyol. The opinion in regard to its value has been divided, with good observers on both sides of the question. After some years of consideration and doubt, the Council has come reluctantly but decisively to the conclusion that there is no satisfactory evidence that Ichthyol has any therapeutic value other than that of a mild antiseptic and that of being soothing to inflamed mucous membranes. Merck and Co., who market the product in the United States, declined to limit their claims so as to harmonize them with the views of the Council, and, therefore, the Council has omitted Ichthyol from New and Non-official Remedies. The Council also omitted Ichthalbin, marketed by E. Bilhuber, Inc., New York. Ichthalbin is described as a compound of ichthyolsulphonic acid and albumin. Its actions are stated to be essentially the same as those of Ichthyol. Therefore, E. Bilhuber, Inc., was informed that,

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unless the therapeutic claims made for Ichthalbin conformed to the claims permissible for Ichthylol, Ichthalbin would be omitted from New and Non-official Remedies. Circulars in use during 1922 contained recommendations for the internal use as an intestinal antiseptic and in skin diseases. Since these claims were incompatible with the evidence obtained by the Council, Ichthalbin was omitted. (Jour. A. M. A., Feb. 16, 1924, p. 565.)

Carbon Tetrachlorid for Hookworm.—Carbon tetrachlorid is at present obtaining such an amount of favorable notice that, unless subsequent experience demonstrates as yet unknown dangers, it may be considered a suitable method for the treatment for hookworm. The drug is palatable, requires no preparation of the patient and is relatively non-toxic. The only fatal results so far recorded were associated with the use of an impure product. The commercial product is unfit for use. Hence, the New and Non-official Remedies quality should be insisted on by prescribing carbon tetrachloride Medicinal-N. N. R. The dosage generally recommended is 0.2 c.c. (3 minims) for each year of life; with an adult, a dose not exceeding 3 c.c. In prescribing, one may order twice the amount indicated for a single dose, and the patient may be instructed to repeat the dose at an interval of fourteen days. It is simply administered from a tablespoon which has been half filled with sweetened water. It is usually best to administer magnesium sulphate two hours after the drug is given. (Jour. A. M. A., Feb. 16, 1924, p. 569.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

MEETING OF FEBRUARY 13, 1924

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, February 13, 1924, at 8 o'clock. The meeting was called to order by the President, Dr. Hamilton. There were thirty-eight members and five visitors present.

The minutes of the January meeting were read and approved.

The following members reported cases:

1. Dr. E. L. TUOHY (Duluth) gave a résumé of cases and records, and a method of showing typewritten data on lantern slides.

Lantern slides were shown with very abbreviated summary of case records. This typed material was fastened to the ordinary lantern slide, according to a method which makes unnecessary any photography whatever. Lantern slides can be made in a matter of a very few minutes by typing directly upon what is known as "Radio-Mat" slides.*

A case was shown with lantern slide of the roentgen picture of the lungs, which prior to autopsy was taken to be miliary tuberculosis. This diagnosis was substantiated by the gross examination of the lungs themselves. However,

the microscopic examination of the tissues revealed miliary carcinomatous metastases, and the original source was found to be annular scirrhus carcinoma near the pylorus.

A record was shown of a forty-five-year-old woman, with moderately advanced pulmonary tuberculosis. Her gastro-intestinal symptoms were attributed to either the toxemia of the advancing tuberculosis, or late invasion of the gastro-intestinal tract, resultant from the terminal depression of her vitality and immunity. On autopsy a few small ulcers were found in the intestine, and a very few tubercles over the surface of the peritoneum. However, a definite large, non-tuberculous gastric ulcer was found. (Specimen was shown.)

The record of a man, aged 50, was shown, who had fully-proven chronic endocarditis with mitral stenosis and auricular fibrillation. A period of restored health was interrupted by much gastric irritability. It might have been assumed that this was entirely secondary either to digitalis medication or to the common visceral congestion incident to the heart state. On the contrary, careful roentgen investigation and analysis of his gastric distress and food relief, established with certainty the diagnosis of duodenal ulcer. The customary frequent feedings and alkalies have very promptly given him relief.

A case record was similarly shown of a man, aged 33, with an early history of throat infection, otitis media and running ears. Recently he developed dyspeptic signs, with characteristic food relief, two or three hour pain after eating, etc. This state of affairs yielded in a short time to a situation in which he did not have food relief nearly so constantly, and his distress followed soon after eating, with a burning sensation in the epigastrium communicated up into the chest. Careful roentgen studies showed up a definite defect in the duodenum but in addition also a penetrating ulcer in the lesser curvature. The latter was evidently of more recent origin, or at least activity, than the former. Realizing the great importance of focal infection and the situation obtaining with his running ears, this was the quandary: one of his ears is good; the other is bad from the standpoint of hearing; what advantage would there be by taking a chance of operating upon his bad ear, to limit focal infection, without attacking the other? Is it not better for him to take a chance even with his ulcer, an ordinary treatment, than to endanger the good hearing he has in one ear by radical operation?

Three cases were shown in brief in which at autopsy primary carcinomata of the bronchi were proven up. In all of these cases metastases had occurred to the spinal column (illustrating the accepted frequency of this type of bony invasion on the part of bronchial carcinoma).

One of these cases presented itself with an outspoken swelling over one parietal bone, strongly suggesting lues. A biopsy readily showed it to be a malignant metastasis.

In only one of these three cases was there particular cough or manifest chest symptoms. It can be said at least that without very careful and accurate post-mortems the origin of these malignancies would have been overlooked, and thereby the probable frequency of primary carcinoma of the bronchial tubes underestimated.

*These sheets can be secured from any of the dealers in moving picture equipment and materials.

One of these cases presented the curious picture of definite kidney tumor, which with easily recognizable metastases into the spine made the probable diagnosis of the fairly common condition of hypernephroma most likely. The autopsy in this case showed bilateral hydronephrosis incident to calculi, shadows of which did not appear in the original spine pictures taken with the intention, because of obvious spinal compression, to show vertebral column detail.

2. Dr. A. E. BENJAMIN reported a case of obstructive jaundice.

Mrs. S., age 48, female, weight 210 pounds, farmer's wife.

Family History: Father died of tuberculosis. Mother 82, in poor health. Four brothers well, one died in infancy. Three sisters well, one died aged 42 of gall stones.

Personal History: Has had children's diseases. "Stomach trouble for years." Attacks of acute indigestion from special foods. Attacks would last twenty minutes. Would become distended with gas, and had vomiting spells. Considerable belching of gas. Bowels habitually constipated. Saline cathartics would relieve her of some of the stomach symptoms. Has always had kidney trouble.

Complaint: Taken ill about the middle of November. Very nervous. Pain in lower part of abdomen. No backache except low down, across the hips. No pain over gall bladder. Pain would extend to left, under ribs. Jaundice began about Thanksgiving time, but not marked until about three weeks ago. Itching began at night when nervous. Would scratch and cause bleeding. Some subcutaneous hemorrhage about January 20th. Spots enlarged and spread. Few vomiting spells.

Chief Symptoms: Jaundice and hemorrhagic painful swelling, anorexia, delirium.

Examination: Skin markedly jaundiced. Heart, lungs, nose, throat, and pelvis negative. Subcutaneous hemorrhagic areas throughout skin, especially on abdomen and limbs. Considerable swelling of left leg, resembling thrombosis.

Laboratory report: Bleeding and clotting time—45 minutes. Hgb. 50% (Dare). Red cells 3,180,000.

Diagnosis: Pre- and post-operative, and pathological after autopsy—"obstructive jaundice."

Treatment: January 18th, 1924. Local anesthesia, vein at elbow exposed. Five c.c. 10 per cent sol. of calcium chloride injected slowly. January 19th, 1924. Local anesthesia, old incision at elbow opened. No vein available. Vein in foot was used. Five c.c. calcium chloride injected. January 19th, 1924. In evening, blood transfusion, given 500 c.c. Patient died late at night, January 19th, 1924.

Autopsy report (Dr. J. S. McCartney, Jr., pathologist): Autopsy limited to examination through abdominal incision.

The body is that of a very obese white woman, 167 cm. in length and weighing at least 210 lbs. Rigor mortis is present. There is hypostasis posteriorly; no edema or cyanosis. Scattered over the trunk and extremities are numerous small blood encrusted areas. These in the beginning are said to have been petechiae but now are covered by crusts. Scattered over the surface of the body are nu-

merous bluish black irregular areas which are not due to hypostasis and clinically were large hemorrhages. The body shows marked jaundice (grade 3). The pupils are equal and regular.

Abdominal incision made. The subcutaneous fat over the abdomen is 5 cm. in thickness. In the fat in the incision an area of hemorrhage is found in the epigastric region. The peritoneal cavity contains no abnormal fluid. Scattered over the intestines are numerous subserosal hemorrhages, some of which reach 1 cm. in diameter; the majority are less than 5 mm. There is marked retroperitoneal hemorrhage, particularly posterior to the cecum and sigmoid. That about the cecum extends beneath the peritoneum onto the anterior abdominal wall. There are a few fibrous bands between the gallbladder and the duodenum.

The pleural cavities and lungs palpated through the diaphragm; no lesion made out. The heart on palpation is normal in size; it is not removed.

The spleen is about normal in size. It is flabby. External surface is slightly wrinkled. On section it is light red in color and the markings are rather indistinct.

The liver is of about normal size. The external surface is smooth. On section the organ is markedly bile stained, the centers of the lobules being prominent. The gallbladder contains several dozen faceted calculi, yellowish white in color and averaging about 6 mm. in diameter. The cystic duct is very markedly dilated, measuring about 8 mm. in diameter. Calculi are found within the cystic duct. The common bile duct is a little larger than the cystic duct and in it calculi are also found; one about 3 mm. in diameter is found just inside the ampulla. The common hepatic duct is about the size of the dilated cystic duct. Calculi are also found within it and in the right and left hepatic ducts up into the substance of the liver. No calculi are found farther than a point 3 cm. above the beginning of the common hepatic duct. The opening through the ampulla is of about normal size.

The stomach contains some cloudy mucoid material. No gross lesions are found in the mucous membrane. The pancreas is about normal in size and shows some fat replacement of the parenchyma. On following out the pancreatic duct it is found to open into the intestine through the ampulla separate from the common bile duct.

The right kidney weighs 140 grams, the left 150 grams. The capsules strip readily, leaving smooth surfaces. On section the organs show marked bile staining and are slightly swollen and cloudy. A few petechiae are found in the pelvis.

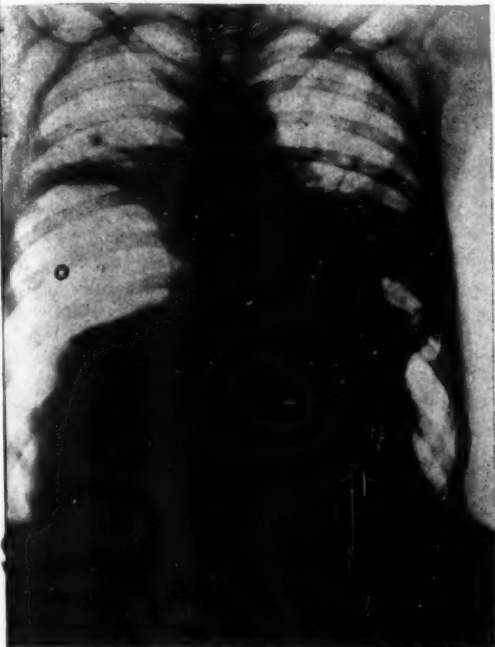
The uterus, tubes and ovaries are apparently normal. The abdominal aorta shows a slight senile change. No further examination of this body is made.

Diagnoses:

1. Calculus obstruction of the common bile duct.
2. Dilation of common, hepatic and cystic ducts.
3. Moderately distended gallbladder.
4. Calculi in gallbladder, cystic, common bile and hepatic ducts.
5. Nephrosis of jaundice.
6. Marked jaundice.
7. Cutaneous hemorrhage.
8. Retroperitoneal hemorrhage.

3. DR. J. F. HAMMOND reported the following case:

This case was admitted to the City Hospital on February 3, 1924. A girl, 17 years old, missed a period the first part of January and thought she was pregnant. She inserted a



atheter with a wire stylet. The following day she began to bleed and had a good deal of pain. Three days later the pain was more marked in the lower abdomen and a physician was called who took care of her from that time until she was admitted to the hospital on Feb. 3, 1924.

On admission it was difficult to get much history. Apparently she had had a stormy time. She did not give any history of chills but had a lot of pain and a good deal of bleeding. She was admitted to the hospital in the early morning of the 3rd. When I saw her on this date she was very much distended, the abdomen being quite prominent. Temperature 104. No pain or tenderness, but marked distention and very rigid. She had a cough; I examined the chest, and the signs were a little irregular. I thought I found some dullness in the back on the right side. The breath sounds were markedly diminished and I thought she probably had some fluid. The liver dullness was completely obliterated. I wanted to find out about the chest condition and thought the easiest way was to take a picture of it. (X-ray shown.) Both lungs were compressed to about the level of the third costal cartilage; the peritoneal cavity was distended with air. The patient seemed to be in extremis. Dr. Drake, Dr. Hall and Dr. Daugherty saw her with me. Nothing much could be made out in the

abdomen, but we felt we might drain her from below and improve her temporarily. We gave her a little ethylene and made a vaginal section. At least a gallon of pus and a large amount of air were evacuated. Cultures did not show that there was any bacillus aerogenes infection.

Although the abdominal distention went down considerably, four days later she was still having a good deal of labored breathing, the liver dullness was still obliterated, and I felt it might be well to drain from above. Under ethylene I made an opening just above the pubes. It was very interesting to see the way the intestines were walled off. Between the omentum and the abdominal wall there was a space one could insert the hand without obstruction from the pelvic cavity to the top of the liver. Care was taken not to open the omentum, thus exposing the lesser peritoneal cavity.

Following this opening the liver dullness returned, and the abdomen was quite flat. The patient's breathing was improved. The day after the vaginal section an enema which was given promptly returned through the vaginal drain indicating a perforation low down in the intestinal tract.

This patient is still having a very bad time; she is very septic, and pulse is weak. She is somewhat cyanosed at times. The outcome is very doubtful.

NOTE: Since reporting this case on February 13th, 1924, the patient died on February 15th. I did not see the autopsy as I was out of town. The report states there was an abscess with feces between the liver and the diaphragm, also about the spleen. The only perforation mentioned was in the cecum. This would not coincide with the fact that an enema given returned at once through the vaginal drain.

DISCUSSION

DR. A. SCHWYZER: I think this is a very unusual case. The picture shows the enormous upward bulging of the diaphragm. This reminds me of a case of splenic anemia where we removed the spleen after it had been reduced by radium, and when we looked up into that dome of the diaphragm it had receded in an extreme manner on the left side. Every heart-beat made a wave-like undulation on this paralyzed and highly receded diaphragm. X-ray showed that for about two weeks it worked very little. It might be that we had to figure with a paralysis from an over-distention of the diaphragm. The case of Dr. Hammond illustrates how valuable the omentum is. Here is shown one of the most important functions of the omentum.

DR. M. S. HENDERSON (Rochester) read his thesis, entitled "Osteochondromatosis of the Hip Joint." (See page 261.)

DISCUSSION

DR. GEIST: Dr. Henderson has presented a topic of real scarcity. I have not seen disease of this type in the hip joint. Jones' work, to which Dr. Henderson refers, was done in Rochester and is a model of modern clinical research. The first case of this kind I ever ran into was

about 12 years ago, and involved the ankle; all my other five or six cases have been in the elbows and knees. The ankle case was a heavy man, weighing over 300 pounds. He had symptoms rather similar to locking of the knee joint; he had the sensation of being thrown and consequent effusion. The x-ray showed three or four bodies in the joint. On opening the ankle the bodies were easily recognized. There were six or seven bodies entirely loose within the joint. In addition to this, there existed about fifteen or twenty small osteo-cartilaginous bodies which were still attached by means of pedicles to the synovial membrane. In fact, some of the pediculated bodies looked like enlargements of normal synovial villi. Some of the pedicles were fairly strong and others were so frail that they were about ready to give way.

All of my cases were in adults and it is very interesting to find Dr. Henderson's case existing in an adolescent. I think Dr. Henderson is to be thanked for presenting this very interesting topic. I should like to ask Dr. Henderson what method of approach he used in opening the hip joint.

DR. A. SCHWYZER: About a year ago I had a case which does, however, not quite belong to this group. Laying all the muscles back from the outer iliac fossa and thus freely exposing the hip joint, we could open it, dislocate the femur very well and see all the parts. At the lower border of the capsule near the acetabulum there were bodies, some of them attached only by a thread, some rather large and hard, and some of them boggy. I was quite impressed by the ease with which we could see all the parts of the joint after cutting the capsule wide open and dislocating the femur. There were no loose bodies, but they were attached by thin pedicles.

I think the case of Dr. Henderson is an unusually pretty one and the x-ray pictures are very fine.

DR. HENDERSON, in closing: The incision used was the Smith-Peterson incision, which in reality is a combination of the old Larghi incision and the ordinary straight incision. We stripped the muscles down freely from the iliac bone, thus coming down upon the top of the joint. We then made a straight incision through the capsule and proceeded to remove the loose bodies.

Dr. Schwyzer's point is well taken. It might have been better to have made the incision larger and thrown the head of the bone out just as we do in an arthroplasty. Our hindsight is usually better than our foresight, and this might have given a better approach to the posterior part of the capsule, but of this I am not exactly sure. We might have been able then to reach the bodies in the posterior part of the joint.

I might add that we have used the Smith-Peterson incision now for some time in un-united fractures of the hip where we do a bone pegging operation, and it gives better approach than any other incision.

DR. R. E. FARR gave a talk on "Some Simple But Useful Adjuncts in the Practice of Surgery." Numerous lantern slides were shown.

The meeting adjourned.

JOHN E. HYNES,
Secretary.

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

STATED MEETING HELD DECEMBER 6, 1923, AT THE UNIVERSITY HOSPITAL. THE PRESIDENT, J. M. HAYES, IN THE CHAIR

DR. S. R. MAXEINER: Case report of gunshot wound in right arm.

I wish to report this case because I believe it is of unusual interest, not so much perhaps from a scientific point of view as from the fact that an extremely difficult accident case treated by me at the Minneapolis General Hospital, with only a fair result, has, through another accident, been converted into what must be considered a much improved end result.

Mr. John W., age 29, male, single. Occupation, police officer.

Family history negative. Personal history negative—no operations.

Present illness: On December 20, 1920, while on duty with a shotgun squad, patient was accidentally shot in the right arm with a charge of buckshot, the end of the gun being practically in contact with his arm. He presented a large wound on the outer side of the arm and an extensive compound fracture of the humerus. The bullets took an upward direction, several coming out through the shoulder. The wound was treated surgically and the arm put up in a Thomas splint, with the arm in extension because of the difficulty of obtaining traction with the arm flexed. Dakin irrigations were used but suppuration was intense and, twenty days later, the wound was more widely opened. The wound drained for five and a half months and the splint was required for four months. Inflammation produced so many adhesions in and about the elbow-joint that it remained extended and could not be flexed. One year later an attempt, under anesthesia, to flex the elbow failed.

On January 28, 1924, the patient sustained his second accident, when he slipped on the ice and fell on the stiff arm. He again reported to the Minneapolis General Hospital, where he was treated by Dr. Watson, resident surgeon, who put the arm up in acute flexion under general anesthesia without difficulty, the elbow-joint being perfectly free. X-ray examination showed only two small chips, fractures of the epicondyles. Since January 4, 1924, the patient has been under my care as a private case and has been receiving both active and passive motion and massage and now has a range of motion of more than 45 degrees, with the arm in a much improved position. I hope not only to keep what we have gained but, by continued physiotherapy, to improve his present condition.

In this case the second injury undoubtedly broke up adhesions which we could not do under anesthesia. The x-ray at present shows what appears to be a hypertrophic arthritis.

DR. STRACHAUER presented the following cases:

Case 1. *Partial Gastrectomy*.—Cancer of the stomach. Patient 65 years of age. Operation performed under perfect local anesthesia due to the extreme enfeeblement, emaciation and chronic bronchitis of the patient.

Case 2. *Resection of Gastric Ulcer and Posterior Gastroenterostomy*.—Patient 11 years of age. A pre-pyloric, chronic, calloused ulcer was resected and a posterior gastroenterostomy performed. The patient had a history of ulcer since the age of 8 years, consisting of periodicity pain, nausea and vomiting, food relief, alkali relief, vomiting relief.

Case 3. *Splenectomy*.—Case of Banti's disease in a woman aged 36, on whom splenectomy was performed. Her hemoglobin of 32 per cent was brought up to 40 per cent by several transfusions. Following splenectomy the blood had spontaneously come up to over 60 per cent.

DR. R. E. FARR presented a paper, "Local Anesthesia of the Abdominal Sympathetic System."

DISCUSSION

DR. A. C. STRACHAUER: First, I want to congratulate Dr. Farr on his thoroughly good paper and lantern illustrations. I think the moving pictures are particularly fine. I can fully endorse the stand he has taken tonight regarding local anesthesia, and am especially gratified to have him call attention to the fact that local anesthesia is real anesthesia. A partial obtunding of pain, as is so frequently obtained, is not anesthesia. The defining of the various forms and types of anesthesia is important. The starting of an operation by the injection of a local anesthesia solution and then having to switch on to either ether or gas and terming the anesthesia "local anesthesia" is incorrect; it should be termed a failure. Likewise, the practice of preceding the injection of local anesthesia solutions by injections of scopolamine, morphine and the like, should not be called local anesthesia, but narco-local anesthesia. I believe that Dr. Farr was an ardent advocate of narco-local anesthesia at one time.

I have no patience with the practice of so-called "local anesthesia" preceded by a "knockout" of some narcotic. I have seen, on a number of occasions, patients brought to the operating room so deeply under the influence of scopolamine and morphine that it was wholly unnecessary to use local anesthesia. They were unable to sit up unassisted and did not know where they were. One of the most distressing situations I know is that of an operation being forced through with the patient under only partial local anesthesia, the patient suffering pain and the operator denying that the patient is suffering. Local anesthesia is real anesthesia. With a properly performed technique, local anesthesia can be obtained in the majority of patients.

For a considerable period of my practice, particularly here in the University Hospital, I did something over 80 per cent of my work under local anesthesia, mostly of the blocking type, which I preferred to infiltration, including surgery of the brain, spinal cord, thorax, abdomen, and extremities. At present I prefer general anesthesia as a routine, employing local anesthesia only on special indication, as I feel that with the majority of patients it is better

for psychic reasons that they be not present at their own operations. The cancer of the stomach specimen which I showed this evening was removed under local anesthesia, due to the patient's enfeeblement, advanced age and chronic bronchitis. The choice of the anesthetic may be largely a matter of individuality, and I believe I am becoming more tolerant in this matter of individuality as affecting various surgical practices and procedures. My point is perhaps well illustrated by one of the Magnus Johnson stories. Magnus Johnson was recently consulted in Washington by an "agriculturalist" as to what he considered to be the best fertilizer. His answer was, "Vell, it is all a matter of taste." When visiting in Chicago last spring I found Bevan, Dean Lewis and other co-workers at the Presbyterian Hospital, extremely enthusiastic over ethylene. Dr. Crile and his associates in Cleveland were tremendously enthusiastic over nitrous-oxide analgesia in conjunction with novocain blocking of the field. Ether is the anesthetic of choice at the Mayo Clinic, in Rochester. It seems to me that it is in large degree a matter of taste, as the standard of surgery and the results are of the very highest order in all these centers.

There is no question at all, as I have proved by my work right in this hospital, but that the majority of surgical procedures can be carried out under perfect local anesthesia, but as to whether they should be performed under local anesthesia is another question. I don't want any one to tell me that I should be using local anesthesia to the exclusion of any other anesthetic.

I want to corroborate one more statement of Dr. Farr's and that is concerning the good work in local anesthesia by the younger men, including the internes and Fellows.

In the majority of instances the operator should perform his own local anesthesia. The assistant or interne is usually not familiar with the magnitude of the work to be undertaken and the field of injection is, therefore, frequently, inadequate. In addition to this, it is often necessary to enlarge the extent of the injection as the operation progresses.

As to the subject of splanchnic injection, there is no question as to the choice, the anterior being performed under direct vision and the posterior being a very blind and undependable procedure. In my personal experience it is the exception that the splanchnics require injection. I have performed a number of gastro-enterostomies and resections of the stomach without injection of the splanchnics.

Regarding the great variety of instruments which Dr. Farr has shown this evening, while they are extremely ingenious I know that it is unnecessary to have so much complicated equipment. Local anesthesia "tastes" good to him and all these accessories "taste" good to him, but it is not at all necessary to have so much machinery and paraphernalia.

DR. S. R. MAXEINER: I have always had a deep interest in local anesthesia, due to the fact that, ever since 1909, I have been pretty directly associated with Dr. Farr. In 1909 I was his interne at the General Hospital and in 1910 started with him, where I remained until I went into the Army, and what I have seen and learned of local an-

esthesia has been largely through the experience gained with him. As I traveled over the United States, through the East and elsewhere, I have seen many so-called cases of local anesthesia in which I would agree with Dr. Farr as to the nomenclature. I have also seen cases here in the hospitals where the interne would come to me and tell me that pneumonia followed certain cases of local anesthesia. When asked what the case was he would say, "gall-bladder." Then I would inquire as to whether gas had been used when they got down to the gall-bladder. "Yes." Well, that isn't local anesthesia. I do not say that pneumonia does not follow local anesthesia, but that, in my estimation and in our experience, these patients have had less severe attacks of pneumonia than they would have had following inhalation anesthesia. I recall an instance in one hospital where they had a much higher mortality rate from local anesthesia than from general anesthesia. When comparing their records case for case you would find that the statistics showed that practically all of their "locals" were cases in which general anesthesia was contraindicated. They were cases not suitable for any anesthesia. Dr. Strachauer mentioned the fact that the internes are doing work under local anesthesia. To be sure. During the last two years I have been doing part of the surgery, and during the last six months all of the surgery, at the Government Hospital and my internes have worked with me off and on for a year, assisting in the operating room continuously for six, eight and nine months at a time, without interruption, and I instructed them personally and have watched them develop. One of these boys, who had done probably sixty hernias and I should say forty or fifty appendices with me and under my supervision, now reports that he is out in the country and, without help, doing appendices under local anesthesia. Recently he did one on a kitchen table—an acute case—and had ideal anesthesia. The matter of technic I believe is extremely important in that the tissues cannot be mauled around as they can be under general anesthesia. This, probably, is one of the greatest advantages of local anesthesia. The patient will not have the gas pains, the distention, nausea, vomiting and shock which accompanies the rough handling of the tissues. I believe local anesthesia has taught me more respect for the tissues than any other thing, and the matter of handling the tissues is important. The lifting of the abdominal wall, packing away of the bowels, etc., is extremely important and vision is far more important here than the sense of touch. If, when the abdomen is opened, you have expulsive force with protrusion and intra-abdominal pressure and you can't expose the pelvis, you might as well change to general anesthesia at once. This morning I did a case of double salpingitis in the subacute state, with both tubes and both ovaries plastered down in the pelvis, with 100 per cent anesthesia and perfect negative, intra-abdominal pressure, and when I closed the abdomen at the end of the operation I could overlap the abdominal wall fully one inch because there was absolutely no expulsive pressure. I could not have done this five years ago, because I had not had the amount of experience. It is only when you do a large percentage of your cases under local anesthesia that it is possible to do the difficult ones under local, and negative pressure is

extremely important. It is the indicator of whether you have anesthesia or not.

DR. BRONCHOW (speaking by invitation): I would like to stress one thing Dr. Farr has brought out in his paper, namely, that *prolonged* special training is not required for surgery under local anesthesia. He has a stunt of calling upon his assistant, after being with him for a short time, to make the injection and carry through some abdominal operation with his help. Before coming in to his service as an assistant I had had no special surgical training, as you know. However, I recall one instance shortly after starting with him when he asked me to inject for and remove a subacutely inflamed appendix. The patient was a partially deaf Polish woman, which somewhat handicapped the psycho-anesthetist. However, the procedure was carried out satisfactorily and the anesthesia reported as ideal.

I admit, of course, that I had a good assistant, but most of the assistants here would agree that our chiefs as assistants are better surgeons. Similar experiences could be cited by any of his previous assistants and I am sure that one is not justified in thinking that prolonged special training is necessary provided the fundamentals of local anesthesia as outlined by Dr. Farr this evening are followed. The intra-peritoneal anesthesia, as described, because of its simplicity and practicability will undoubtedly be more widely used and is destined to become the method of choice.

DR. R. C. WEBB: The remarks which have been made concerning the conscious patient during an operation remind me of a recent experience with local anesthesia. A locomotive going at a high rate of speed left the rails and just before it tipped over the engineer went out the window. He received numerous injuries, among which was an inguinal hernia, as a result of the accident. When he had recovered sufficiently from his other injuries I repaired his hernia, using local anesthesia. He appeared to be well satisfied with the anesthesia and stated that I did not hurt him. He stated that the operation was painless, when interviewed a day or so later by a claim agent. When he had recovered and was settling with the claim department for the time lost and for the suffering which he had undergone everything was agreed upon except the hernia. He mentioned the hernia and the operation which he had to undergo and was reminded of his remarks concerning the lack of pain. He said, "Yes, but I think I ought to have something for the strain and agony of lying there on the table during that operation and expecting that he would hurt me."

DR. H. B. SWEETSER: Although I have used local anesthesia in a fair number of cases, I do not think I know enough about it, either to condemn it as many do, or to advocate it so absolutely for all operations as does Dr. Farr. Under certain circumstances and for certain operations I think it ideal, but, as Dr. Strachauer has said, "It is likely to be a matter of taste." In discussing the question of anesthesia, we must take into consideration, first the anesthetic, then the patient and lastly the operator.

If it were a question between a general anesthetic as dangerous as chloroform, for instance, and a local anes-

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thetic as innocent as novocain, there could be no discussion as to method. If surgeons were limited to such a choice, then we would all be morally bound, in the best interests of our patients, not only to perfect ourselves in methods of local anesthesia, but to apply them in all cases where possible. But we are *not* so restricted; we *do* have general anesthetics which statistics show are fairly safe if expertly given. It is plainly evident, however, that surgeons are not satisfied with present methods or anesthetics, for constant effort is being made to devise better methods and discover safer anesthetics. This morning I had the pleasure of witnessing for the first time the giving of our latest anesthetic ethylene, here in the University hospital; and many times I have watched Dr. Farr do major operations very ideally with his local methods. At present it may be said that the great majority of surgeons have not concluded that it is necessary to abandon general anesthesia in the interests of their patients.

From the standpoint of the patient it is not all a question of abolition of pain. Many object to being conscious of the operation. But a graver question has to do with the nerve strain endured during a prolonged major operation. I have had patients ask if I were about through even before we had finished the aseptic preparation. If I am able to get perfect local anesthesia, I am willing to go as far as the patient, but if my patient wishes me to shift, I am never so wedded to the idea of success as not to be willing to shift, and I do not feel that I have failed. During thyroidectomy, if the patient gets nervous and asks if we soon will be through, I do not think it fair to keep repeating, "We will be finished in a few minutes," when we know we are not truthful; when this occurs I am glad to pocket my pride and switch to gas-oxygen. In the abdomen, without the expertness of Dr. Farr, I know we can get the much-sought-for negative pressure by blocking and opening the abdominal cavity under novocain, and then continuing with nitrous oxide gas, and no ether. This I think of especial advantage in cases where we are not certain as to what we will find and what we expect to do; it allows us to make a freer and wider investigation and possibly a more complete operation. We have used this combined method for a long time in many cases and have observed the results, and I am sure our mortality rate justifies its continuance. This does not mean that I never complete an abdominal operation under local anesthesia; I do; but that I am not willing to put too great a stress on the patient, as I think, unnecessarily. I was very glad to hear Dr. Farr and Dr. Maxeiner say that when you get expulsive efforts, you might as well quit, and I was very much interested to have them explain why they were so careful in handling retractors because any abnormal pulling or irregular traction might defeat the whole endeavor and compel them to change to general anesthesia. This explains some of my failures, and I intend to reform. Caudal anesthesia we have found very valuable and use it almost exclusively in operations on the perineum and bladder. Some patients are so phlegmatic in temperament that success with local anesthesia is assured, but many are so excitable that most surgeons, except enthusiasts, are not willing to make the trial. Of course, the nervous sys-

tem may be quieted by hypodermic medication, but this is no longer pure local anesthesia, but approaches general anesthesia.

As regards the operator, certain qualifications are essential. First, he must, by study and practice, perfect himself in the best methods. Necessarily, he must learn to handle the tissues with the utmost gentleness. Then he must be honest with himself and not try to deceive himself into believing that he is using local anesthesia while all the time his patient is complaining of pain. In other words, he must be humane. Just a word about the men who say they use local anesthesia. I have been around too many clinics and have seen many operations under so-called local anesthesia, and have shuddered to think that I myself might some day occupy the place of some of these patients. It is really horrifying to watch a patient undergoing a major operation, facing the possibility of death, and suffering pain, and to hear the operator telling him "he is not hurting him," "he is a coward," "he is a baby," "shut up," "lie still, or I'll squirt you in the face," etc. It is not only immoral, it is unchristian and inhuman.

DR. FARR'S closing remarks: I am very much pleased with the discussion and especially that of Dr. Strachauer. It makes me feel that his attitude towards local anesthesia is undergoing considerable change.

This paper was presented with the idea of calling to your attention the facility with which local anesthesia may be used in abdominal surgery as well as to show that there is a widespread belief that its application here is limited. I do not feel that it is necessary to have as elaborate an outfit as I possess for this work. However, equipment and surgical technic are especially important. Neither do I suggest that everyone else should use local anesthesia. I am simply trying to show what *can* be done. I also feel that acquiring the knowledge of how to use local anesthesia is not especially difficult at this time. In the earlier years it was difficult but at present we have an opportunity to see those who are well versed in the application and we may practice the art without harming our patients.

Beginners should not feel that it is a disgrace to be compelled to go to general anesthesia. An operation may be started under local and general may be added at any time that it becomes necessary.

Dr. Sweetser has asked regarding mortality. The question can only be answered provided groups of cases operated upon are alike. Two years after I began doing surgery I did 199 major operations without a death. At the present time I cannot duplicate this performance—I have a wider reputation and the cases coming to me are much more serious. For instance, if 50 per cent of one's operations are for laceration of the perineum his mortality is apt to be low. Someone has said that statistics may be used to prove anything, even the truth. My suggestion is that the method is the most benign yet developed and that it should be simplified as much as possible and that experience with the simpler cases will perfect a surgeon's technic so that he may be able to offer to those who should have local anesthesia its beneficent influence.

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:
F. J. HIRSCHBOECK,
 FIDELITY BLDG., DULUTH
THOMAS A. PEPPARD,
 LA SALLE BLDG., MINNEAPOLIS

ARTIFICIAL PNEUMOTHORAX IN PULMONARY TUBERCULOSIS, A STUDY OF 109 CASES—John T. Farrell, Jr., and Roland F. Fleck (*Amer. Rev. of Tuberculosis*, January, 1924): The indications for pneumothorax given by these writers who summarize the use of the treatment at White Haven Sanatorium, White Haven, Pennsylvania, are as follows: "Hemorrhage or persistent oozing which could not be controlled by simpler methods, failure to respond to routine treatment, and sometimes the idea of the lessening of toxicity by lowering temperature, decreasing expectoration or relieving cough, and in certain earlier cases to test the value of a method which was receiving commendation from other clinicians. Recourse was had to the method only after the patient had been carefully studied by one of the visiting physicians in his private practice, or after residence in the sanatorium. The control of collapse was determined by repeated physical examinations, and later by the combined use of this method and the x-ray, the latter by both the fluoroscope and stereoscopic plates."

Of the 109 cases 45 were improved, 42 unimproved and 22 died in the sanatorium. The percentage of improvement increased with the age of the patient. Patients who had had the disease from one to two years showed less improvement than those who had a history of symptoms extending over less than one year or more than two. The less extensive the involvement the greater was the percentage of improvement. The presence of tubercle bacilli is not a contra-indication to the treatment. Patients improving under preliminary treatment gained the most from the use of pneumothorax. The longer the duration of the pneumothorax treatment, the higher was the percentage of improvement.

ARTHUR T. LAIRD.

THE QUESTION OF THE MOST RELIABLE AUSCULTATORY SIGNS IN THE DIAGNOSIS OF PULMONARY TUBERCULOSIS—Fred H. Heise (*Amer. Rev. of Tuberculosis*, Nov., 1923): Heise examined a group of 1,000 cases. He classified them as follows:

| Group | Physical Findings | No. of Cases | Parenchymatous X-ray Changes Per cent | Tubercle bacilli in Sputum Per cent | Clinically Tuberculous Per cent |
|-------|---|--------------|---------------------------------------|-------------------------------------|---------------------------------|
| 1. | Broncho-vesicular breathing | 248 | 40 | 18 | 59 |
| 2. | No abnormal sounds | 45 | 51 | 22 | 60 |
| 3. | Breathing distant or exaggerated | 13 | 31 | .. | 67 |
| 4. | Indefinite râles ... | 36 | 53 | 19 | 72 |
| 5. | No râles, upper third of chest ... | 93 | 67 | 43 | 78 |
| 6. | Fine râles, upper third of chest ... | 140 | 78 | 45 | 82 |
| 7. | Moderately coarse râles, upper third of chest | 425 | 98 | 47 | 99 |

In Dr. Heise's experience râles are the only auscultatory physical signs of any importance in the diagnosis of pulmonary tuberculosis unless breath sound changes are so marked as to approach the bronchial type. A negative physical examination by no means rules out clinical tuberculosis. The presence of broncho-vesicular breathing alone is not a particularly valuable sign of clinical tuberculosis.

ARTHUR T. LAIRD.

TECHNIQUE OF CHEST ROENTGENOGRAPHY—L. T. Black (*Amer. Rev. of Tuberculosis*, December, 1923): The author has endeavored to discuss the impracticability of Bray's technique. Bray's technique is, in brief, taking a posterior-anterior plate with standard and uniform methods, once during suspended costal inspiration, and immediately thereafter, during suspended diaphragmatic inspiration. Posterior exposures were preferred to the usual anterior (face to the plate) exposure, because on abdominal breathing the thorax does not remain in contact with the film owing to the protrusion of the abdomen, thus causing a technical difference which might prove confusing in diagnosis. Certain changes in the densities seen in x-ray plate were attributed to height and depth of the inspiration employed by the patient preparatory to the x-ray exposure. Comparisons were made in the height of the suspended costal inspiration with the height of the diaphragmatic inspiration. On costal inspiration expansion of the lung was manifested by an increase in the circumference of the chest, while on diaphragmatic inspiration, the chest remains immobile, and expansion is effected solely by the descent of the diaphragm. The direction in which the lung expands effects its shape. It is relatively short and thick on costal inspiration but long and narrow on diaphragmatic inspiration. Inasmuch as the hila move in unison with diaphragm, the hilar shadows may be two interspaces lower in diaphragmatic than in costal inspiration; and there may be distinctly appreciable changes in outline density. Annular shadows may be present in one and absent in the other. In certain instances, shadows termed as "hard" and regarded by some observers as denoting fibrosis and inactivity may be converted into shadows which are "soft" and commonly interpreted as evidence of an active lesion.

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In a comparative study of roentgenographs, taking the posterior-anterior position during suspended diaphragmatic inspiration and suspended costal inspiration on 25 patients with pulmonary tuberculosis, there were found two cases of far advanced pulmonary tuberculosis in which the roentgenographs taken during suspended diaphragmatic inspiration revealed changes of a definite nature which were not revealed in the roentgenographs taken during suspended costal inspiration, thus corroborating Bray's observations. In a series of 11 cases, roentgenographs in the posterior-anterior position and anterior-posterior position during suspended diaphragmatic and suspended costal inspiration, there was found only one case in which the findings differed during suspended costal inspiration and diaphragmatic inspiration.

In spite of these findings and as a result of a general survey of the situation, considering the diagnosis of these differences and the economic side of the question, it can hardly be recommended that for general diagnostic purposes in pulmonary tuberculosis more than one type of position and inspiration be used. However, the matter of choice for general use rests entirely with the individual case.

J. R. FUCHLOW.

SOME RESULTS OF ARTIFICIAL PNEUMOTHORAX TREATMENT—William H. Morris (Amer. Rev. of Tuberculosis, January, 1924): Since the opening of Gaylord Farm Sanatorium, Wallingford, Conn., 2,900 patients have been under treatment; 75 cases or 2.6 per cent have received artificial pneumothorax, a very conservative selection, as according to the author 5 per cent has come to be generally accepted as the usual proportion of cases found suitable for such treatment.

Morris gives indications for pneumothorax treatment as follows:

1. Moderately advanced patients, whose lesion is either entirely confined to one lung, or in whom the lesion of the contra-lateral lung is apparently inactive and does not extend over more area than that portion of the lung above the second chondro-sternal articulation. This group is almost always given a trial on the usual regimen of rest treatment and only on failure to make a decided improvement is pneumothorax instituted. We include also in this group certain minimal cases, who after a fair trial on the rest regimen fail to rid themselves of signs of activity and whose x-ray picture shows a spreading lesion.
2. Moderately advanced or far advanced patients with chronic type of lesion usually associated with cavity formation. Here treatment may be undertaken on the more active lung even in the face of considerable trouble in the other side, in the hope of ameliorating symptoms and getting the patient up and around.
3. Severe or repeated hemoptysis, without a very marked lesion on the other side, provided that the side from which the hemoptysis is occurring can be definitely determined.
4. Very acute unilateral lesion, where x-ray shows a dense mottling confined to one lung. Our feeling here is that collapse should be induced without delay.

The later cases have uniformly been studied with the aid of x-rays.

The selective collapse described by Barlow, that is the tendency of small amounts of gas introduced into the pleural cavity to localize over the portion of the lung showing the greatest evidence of tuberculous activity, was found in 18 out of 38 cases of partial pneumothorax.

The results in the later cases treated were better than in the earlier series.

The late results of the second series (25 cases) show 52 per cent still under treatment, all improved. Of the others, 24 per cent have improved and eight per cent (2) have secured an arrest of the disease. Fourteen per cent only of all the cases in which a pneumothorax was established were treated more than a year.

ARTHUR T. LAIRD.

INTRAPERITONEAL OXYGEN INFLATIONS IN THE TREATMENT OF ASCITIC TUBERCULOUS PERITONITIS—Walter L. Mattick (Amer. Rev. of Tuberculosis, January, 1924). Pneumoperitoneum in the Treatment of Tuberculous Peritonitis—Oscar Monroe Gilbert (Amer. Rev. of Tuberculosis, January, 1924): Oxygen inflation of the peritoneal cavity was first used for diagnosis in 1902 by Kelling. In 1913 Godwin, after four years' experience with oxygen inflations followed by celiotomy in tuberculous (ascitic) peritonitis, noted the non-recurrence of the condition in patients so treated and was astounded that such a promising procedure was not more generally used. In 1913 Bainbridge described two methods of using oxygen after celiotomy and recommended its use for the following purposes: (1) to lessen shock, (2) to overcome negative pressure on certain types of tuberculous peritonitis, and (3) for effect on pus-producing bacteria and their toxins.

Stewart and Stein gave great impetus to pneumoperitoneum as an aid to x-ray diagnosis in 1919, and it was during the course of their work that Stein noticed the favorable results in cases of tuberculous peritonitis with ascites.

Mattick and Gilbert report three cases in which this method of treatment was used with apparent advantage to the patient, Mattick using oxygen and Gilbert filtered atmospheric air.

Mattick's technique was as follows:

"Operation: On October 27, 1922, under aseptic precautions, according to the above described technique, the patient's abdomen was pierced by the trocar and cannula about 1.5 inches to the left and below the umbilicus. Approximately 40 to 50 c.c. of clear amber fluid was withdrawn. After several attempts to remove more fluid, no more would drain out and oxygen was injected through the same cannula until the patient complained of discomfort from gas distention and liver dullness was obliterated. X-ray pictures were taken within one hour after inflation in both prone and lateral positions."

Gilbert introduced the sterile filtered air by means of a pneumothorax apparatus. All patients had some temporary discomfort.

ARTHUR T. LAIRD.

SURGERY

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PAPILLARY TUMORS OF THE RENAL PELVIS—

Albert J. Scholl (Surg., Gyn. and Ob., February, 1924): The majority of tumors of the renal pelvis are of papillary origin. In the early stages they are small, often multiple, flat or thickly pedunculated and confined to the renal pelvis. They grow rapidly and invade the whole kidney pelvis after distending it by masses of the growths. The ureter and bladder often become secondarily involved with transplants.

Hematuria is the most common symptom of this condition. The hemorrhage is usually profuse and may be continuous or intermittent. In differential diagnosis essential hematuria is usually characterized by a long continued mild hematuria with rarely any passage of clots. In cystoscopy a unilateral hematuria is demonstrated and if bladder metastases are present, papillary bladder tumors are seen.

Pyelography often makes the diagnosis certain by the distortion and filling defects. Pain of an aching character may be present over the kidney area and sometimes colicky pains may be present caused by the passage of blood clots. The prognosis is bad. Few remain well and free of metastases.

The treatment consists of nephrectomy with ureterectomy and constant checking up on transplants in the bladder with the cystoscope. If the tumors are too large to fulgurate resection is resorted to.

Eight cases with histories and plates are reported by the author, with the results to date.

W. P. HERBST.

A FUNDAMENTAL FACTOR IN THE RECURRENCE OF INGUINAL HERNIA—

M. G. Seelig and K. S. Chouke (Arch. Surg., November, 1923): Seelig and Chouke list as the essentials to a perfect cure, high sac ligation, restoration of the abdominal wall and primary wound healing. The first and last factor they dismiss with a word and go on to describe experiments designed to throw light on the possibility of complete and permanent restoration of the defective abdominal wall. This is usually attempted by suturing the internal-oblique and transversalis muscles and their conjoined tendon to the inguinal ligament of Poupart. The authors doubt if this procedure really accomplishes the intended purpose. Studies of fascia-muscle healing were carried out on dogs. A reduplicated edge of fascia lata was in each case sutured to the underlying muscles so that there was no tension on the suture line and that any separation could not be due to traction. Fifty experiments were carried out. In every instance where untraumatized muscle and fascia had been sutured together,

on healing the fascia was widely separated from the muscle to which it had previously been sutured. In every instance in which the muscle was traumatized by the excision of a wedge so that the fascia could be sutured in the raw trough, there was an attempt at direct union between fascia and muscle. This union was complete in only one instance. The authors conclude that attempted suture of muscle to fascia is inadequate and that to obtain good results one of the methods of uniting the fascia of the external oblique or the transversalis fascia to Poupart's ligament must be employed. The methods are those of Andrews, Pitzman, Harrison or Slattery.

DONALD K. BACON.

ACTINOMYCOSIS OF THE HEAD AND NECK. A REPORT OF 107 CASES: Gordon B. New and Fred Figi.

(Surg., Gyn. and Ob., Nov., 1923.) Actinomycosis of the head and neck is probably the most commonly overlooked pathological condition occurring in this region. The infection is more common in males than in females, and may appear at any age. Seventy per cent of the patients reported were between the ages of twenty-one and fifty years. The activity of the disease bears no relation to the age of the patient.

All authors agree that actinomycosis occurs most frequently in the cervicofacial region. The 107 cases reported comprise 68 plus per cent of all cases of actinomycosis in the Mayo Clinic. Six cases of actinomycosis of the tongue were seen in the last three years and only 35 cases were found reported in the literature up to 1922.

The method of infection is very uncertain and different views are held by different investigators. Some contend that the infection is conveyed by direct contagion from cattle; others say that it is introduced by foreign bodies containing the organism; and still others hold that it is transferred by direct contagion from one human being to another. The organism has been demonstrated in carious teeth and tonsillar crypts of people with no demonstrable actinomycosis.

In this series of cases, 80 questionnaires resulted in finding that 56 per cent of the patients had not been in contact with the disease in cattle, and 43 per cent had been more or less closely associated with the disease in animals previous to the onset of their symptoms. Other facts are of importance, such as the presence of dental caries, picking decayed teeth with straws, or chewing bits of straw or grass.

"The clinical history of patients with actinomycosis of the head and neck depends on the virulence of the infection and the amount of secondary infection." The most common symptoms are stiffness, pain, and swelling in the region involved. The picture most common is that of multiple small draining abscesses.

Diagnosis must be based on the microscopic demonstration of the actinomycosis. The clinical picture and the presence of sulphur bodies help. Sulphur bodies are found most frequently in freshly opened pockets. Often it takes several weeks or more of observation to demonstrate the actinomyces microscopically and in 8 cases in this series the condition was not demonstrated microscopically. Actinomycosis of the tongue may simulate cancer, and infected cyst, or chronic cellulitis. Periosteal sarcoma must be

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thought of and a list of conditions to be differentiated is given. "A tumor or gland of the neck or head which is clinically malignant, but does not prove so microscopically, is usually actinomycotic and further study of the issue may demonstrate this."

Of 85 patients, 70 per cent were well in from less than one year up to five or more years; 8.2 per cent were dead, and 21 per cent were under treatment. Six patients had meningeal involvement at the time of examination. One died from cancer which developed on an actinomycotic scar.

The best treatment to employ is drainage of abscess pockets and daily packing with iodoform gauze, radium, and iodides up to 200 grs. three times a day. The results from this treatment are very satisfactory and no patients except those with very advanced conditions with masses in the supraclavicular region, have had any extension develop in the chest.

W. P. HERBST.

HEMORRHAGE IN THE GENITO-URINARY TRACT

—William E. Lower (Surg., Gyn. and Ob., March, 1924): Hematuria from the genito-urinary tract is rarely alarming on account of the hemorrhage per se. However, it is a very important diagnostic symptom and should always be thoroughly investigated before a diagnosis of essential hematuria is made. Hematuria may be due to any of the following conditions:

(A) Outside the urinary tract:

1. Pathological conditions outside the genito-urinary tract.
2. Ingestion of certain drugs.
3. Acute and chronic febrile diseases
4. Scurvy.
5. Purpura.
6. Leukemia.
7. Pernicious anemia.
8. Septic infarct.
9. Aneurysm.
10. Syphilis.
11. Parasitic diseases.

(B) Within the urinary tract:

1. Bladder tumors.
2. Calculi urinary tract.
3. Renal tuberculosis.
4. Essential hematuria.
5. Cystitis.
6. Hypertrophy of the prostate.
7. Trauma.
8. Calculi in the bladder with hypertrophy of the prostate.
9. Carcinoma of the prostate.
10. Diverticula.
11. Hydronephrosis.
12. Cystic kidney.
13. Ulcer of the bladder.
14. Congenital deformity of ureters and kidneys.
15. Foreign body in bladder.
16. Papilloma of the urethra.
17. Strictures.

Tumors, tuberculosis, and calculi are the most frequent causes of hematuria, although some consider nephritis as first in importance.

Blood appearing at the meatus indicates a lesion anterior to the sphincter muscle. Blood at the termination of mic-turition is suggestive of a lesion within the urinary bladder. Blood in the semen suggests a lesion in the seminal vesicles or prostate. Blood after a renal colic suggests a lesion above the bladder. The source of bleeding is best discovered during a hemorrhage.

The author has charted 2,922 urogenital disease cases in respect to hemorrhage and lesion and concludes by saying:

"The above considerations emphasize the points that hematuria from the urogenital tract may be a symptom of almost any pathological condition within that tract and that therefore the presence of blood in the urine must be considered as an imperative indication for the application of every diagnostic measure at our command to locate the primary source of bleeding, and that no case should be classified as one of essential hematuria until every diagnostic measure has been applied without avail."

W. P. HERBST.

LATE ULNAR NERVE PALSY—Edwin M. Miller (Surg., Gyn. and Ob., January, 1924): Late ulnar nerve paralysis is peculiar in that it appears many years after the fracture. In nearly all cases the fracture occurs in childhood and usually between the third and fifth year. The usual type of fracture is one in which the external condyle is completely separated. Occasionally the site of injury has been at the internal condyle or in the supra-condylar region. Lateral and forward dislocation of the broken capitulum takes place and owing to inaccurate reduction non-union results, with a development of a cubitus valgus. The nerve is displaced from its bed as the olecranon process impinges against the medial condyle. This results in stretching and trauma to the nerve upon flexion. The paralysis in forty per cent of the cases occurred between 20 and 30 years after the fracture. It may begin as early as 3 or as late as 40 years after the fracture.

The methods of treatment are:

1. Cuneiform osteotomy to correct the deformity of the humerus.
2. Liberation of the nerve from its bed.
3. Transplantation of nerve in a new groove made by removal of a wedge-shaped piece of bone and lined with an aponeurotic-fascial flap.

The last method is the most popular method of treating the palsy. Ten case-records are given with illustrations and roentgenograms. Illustrations of steps in the operation of transplantation of the nerve to the flexor side of the elbow are given. As a prophylaxis against the development of the cubitus valgus deformity and the resultant ulnar nerve palsy an open operation with accurate fixation of the external condyle is suggested in those cases in which the external condyle cannot be accurately reduced by manipulation.

W. P. HERBST.

GYNECOLOGY AND OBSTETRICS

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THE LIPOIDS OF MATERNAL AND FETAL BLOOD AT THE CONCLUSION OF LABOR—J. Morris Slemmons and Henricus J. Stander (Johns Hopkins Hosp. Bul., January, 1923): This report is based upon work done to secure information regarding the activity of the placenta in the transmission of fats from the mother to the fetus. The author believes that the human placenta is impermeable to fats, as such. He refers to animal experiments of Ahfeldt which show that, after intensive feeding of fats, the fat-content of the maternal blood becomes ten times that of the fetal blood. Also the work of Gage and Gage, and of Mendel and Daniels, which indicate that the placenta is an effectual barrier to the passage of fat.

Their own work consisted of determinations of the fat-content of the maternal blood together with that of the fetal blood, taken at the time of birth. This shows a uniform finding of a higher percentage of fats and lipoids in the maternal blood. It was impossible to demonstrate any constant relationship between the fat content, and the character or duration of labor, the type of anesthesia, or other complicating factors. Their results show a complete independence of the two organisms as regards fat metabolism, and justifies the assumption that the fetal fat is synthesized from some material (probably glucose) which is freely supplied by the mother and which passes through the placenta.

As regards lecithin, the physiologic rôle of this substance is still unexplained. It possibly plays a part in the early stage of fat-metabolism. The author's studies indicate the same independence of the maternal and fetal circulations as regards lecithin content. The maternal lecithin increases towards the end of gestation, possibly as a preparation for lactation. The fetal blood plasma has a lower content, or about that of the normal adult.

The actual information concerning the significance of cholesterol is also meager. The cholesterol and lecithin seem to have certain antagonistic relationships, and are known to vary more or less simultaneously in amount. The increase of cholesterol may be part of a protective mechanism against an hyperlecithinemia. Although the concentration of cholesterol is never the same in the maternal and fetal bloods, the difference is neither constant nor characteristic. The authors have been unable to show any relationship between the cholesterol content and toxemia or eclampsia.

They conclude: 1. During the latter part of pregnancy, the fat, lecithin, and cholesterol content of the maternal blood increases, probably representing a preliminary step in the preparation for lactation. 2. The mother's blood contains much more of these substances than the

fetal blood does, and there seems to be a complete independence between the two organisms. 3. The placenta is impermeable to these substances. 4. Fetal fat then must be synthesized, probably from glucose, which is freely supplied by the mother in response to the demands of the fetus. 5. There is no characteristic change in the blood fat or blood lipoids accompanying the development of eclampsia or the allied toxemias.

ARCHIBALD L. McDONALD.

THE OCCIPUT POSTERIOR—P. T. Harper (Amer. Jour. Ob. & Gyn., Vol. 8, p. 53): The author presents this subject because he believes that no obstetric condition, which occurs as often, incurs more difficulties and responsibilities. It is pointed out that statistics based on examinations made at indifferent times during labor are valueless in determining the frequency with which the occiput, at the onset of labor, is directed posteriorly. The author insists that the primary position of the occiput is posterior in approximately 50 per cent of the cases. It is emphasized that the clinical course of labor can be correctly interpreted if certain fairly constant physical signs are remembered. The most striking physical characteristic of the child when the position is posterior is a varying degree of deflexion or bending backward of the presenting part, the mechanics of which is discussed in some detail. The result of auscultation and abdominal palpation are dependable as early physical signs: hearing the heart tones in one or the other flank, and palpating the small parts anteriorly. When the head has advanced to the middle of the pelvis in posterior positions, the cervix is further back and the anterior lower segment is more elongated than in anterior positions. The mechanics of anterior rotation of a posterior occiput are discussed, emphasizing the fact that the forces and conditions which interfere with anterior rotation are due to inertia of the uterine muscle, deflexion and to lack of tone of the pelvic floor.

Vaginal examination shows three points of clinical importance when the head is well down: first, presence of the caput forward of the occiput is evidence of deflexion characteristic of all posteriors and can be taken as a measure of it in the individual case; second, its location at one side or the other of the sagittal suture shows primary location of the occiput to have been toward the opposite side; third, thickness or depth of the caput can be accepted as positive proof of the amount of muscular efficiency actually expended in driving the presenting part downward.

Treatment is taken up minutely and the author's summary follows:

Until the shoulders have become engaged, treatment that displaces the child's body toward the front and holds it there favors assumption of an anterior position by the occiput, provided the presenting part is so located that the occiput can rotate. The latter may lie above or below but not in the inlet. After engagement of the shoulders, neither forward displacement of the body nor even manual rotation of the occiput gives hope of permanent assumption of an anterior position by the latter; for, when the rotating force is removed, the occiput reassumes its anatomical relation to the shoulders. When labor is obstructed at the inlet or in

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the upper middle pelvis and the occiput is posterior, the conditions to be treated are those that have caused obstruction, such as retraction and pelvic deformity, and not posterior position of the occiput. In other words, there is no treatment for the occiput posterior as such when the labor is obstructed high up. When the presenting part rests in the low middle pelvis or at the pelvic outlet and when anterior rotation and subsequent advance do not occur, treatment depends upon analysis of cause or causes of delay, in the management of which the most important item is artificial aid in doing what nature is unable to do, in doing it in the way that most closely simulates nature, and in doing it before untoward results of delay demand it. The judicious use of forceps meets each of these requirements.

He concludes by recommending that the attitude toward occiput posterior should be one of active expectancy, that is, applying treatment which is indicated, but not meddling.

L. M. RANDALL.

THE PATHOLOGICAL ANATOMY OF THE CORPUS LUTEUM (ABSCCESS, CYST, HEMATOMA, AND NEOPLASM)—Emil Novak and Richard W. TeLinde (Johns Hopkins Hosp. Bul., September, 1923): This report is based upon an examination of the pathological material in the gynecological clinic of the Johns Hopkins Hospital for the past few years. The authors suggest the following classification to cover the various changes which are to be observed in the corpus luteum:

- I. The normal cycle: (a) Stage of proliferation. (b) Stage of vascularization. (c) Stage of maturity. (d) Stage of retrogression.
- II. Physiological variations: (a) Cystic form. (b) Hemorrhagic form. (c) Corpus luteum of pregnancy (cystic and solid).
- III. Pathological variations: (a) Corpus luteum abscess. (b) Corpus luteum cyst: (1) recent, (2) old. (c) Corpus luteum hematoma: (1) recent, (2) old. (d) Corpus albicans cyst. (e) Corpus albicans hematoma. (f) Combined types. (g) Corpus luteum neoplasm (luteoma).
- IV. Allied conditions: Multiple "lutein" cysts of the ovary.

The normal cyclic changes in the corpus luteum are well described and illustrated and the significance of each is discussed, particularly the relationship of the vascular stage to hemorrhagic changes, and of the retrogression, to the corpus albicans.

Variations in the cyclical changes are not infrequent, and it is difficult to distinguish between those which may be considered as physiologic, and those which are definitely pathological. Some consider all cystic forms as abnormal but the authors class as pathological only those which are larger than the normal ovary. Lutein cells showing more or less evidence of degeneration are to be found conspicuously in the cyst walls. Hemorrhage into the corpus luteum during the vascular stage is common, and the distinction between physiologic and pathologic types is not clearly defined. The corpus luteum of pregnancy is larger than that of menstruation and is more likely to be cystic. The latter type is found more often in cases of ectopic gesta-

tion. Hemorrhage is not uncommon in the corpus luteum of pregnancy, and there is a more complex organization of the fibrous structure.

Pathological variations: Abscesses have been frequently described. They are more likely to develop in the cystic or hemorrhagic forms, and are often associated with inflammatory pelvic lesions. The wall of the abscess shows the typical yellow color with inflammatory infiltration. They divide the corpus luteum cysts into the recent and old, which represent different stages of the same process. They consider as pathological those which exceed 2 c.m. in diameter. They are likely to be associated with abnormalities of pregnancy, pelvic inflammatory disease, or fibroids. There was little or no associated menstrual disturbance. The question of Corpus Luteum Persistens is discussed at some length, particularly in regard to its effect upon menstruation, and sterility. They believe that many of the reported cases are actually due to an unrecognized pregnancy, as may be proven by microscopic study of the endometrium.

The hematomas are relatively common, but there is no absolute distinction between the abnormal and normal types, except size. Most of their cases were associated with pelvic inflammatory disease which must be considered as a causal factor. They are classed as recent or old, depending upon the structure of the wall. As regards the neoplasm, the authors make no very definite statements. The article gives a comprehensive review of this subject and is worthy the careful study of all who are interested in the pathology of the corpus luteum.

ARCHIBALD L. McDONALD.

PEDIATRICS

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A STUDY OF THREE HUNDRED CASES OF PERTUSSIS IN A HOSPITAL—Charles Herman and Thomas Bell (Arch. of Ped.): 1. Females are more frequently affected with pertussis than males.

2. Eighty per cent of all cases of pertussis occur in children under 5 years of age.

3. The largest number of cases of pertussis occur during the summer months, at a time when the other communicable diseases are at their lowest point.

4. Every spasmodic cough is not whooping-cough. There are cases of pseudo-pertussis. The term pertussis should be restricted to an acute infectious and communicable disease, caused by the Bordet-Gengou bacillus.

5. The Bordet-Gengou bacillus is regularly present in the catarrhal stage of the disease.

6. Pertussis is most communicable in the catarrhal stage, when its true nature is not recognized. It is usually not communicable after the fourth week.

8. The respiratory complications are by far the most important. They are present in 58 per cent of the series. Fourteen per cent had a complicating bronchopneumonia.

9. The earliest and most characteristic change in those patients who have bronchopneumonia is the presence of localized fine resonant râles at the base or at the angle of the scapula, especially on the left side.

10. The susceptibility and unfavorable course of pneumonia in infants is probably due to immunologic, not to anatomic peculiarities.

11. There is no conclusive evidence that pertussis is an important factor in the causation of pulmonary tuberculosis. A positive Pirquet reaction does not become negative in the course of pertussis.

12. The principal aids in the early diagnosis of pertussis are the presence of a relative and absolute lymphocytosis in the blood; the presence of the Bordet bacillus in the sputum; and a positive complement fixation test. The cutaneous tests have not proved of any value.

13. The prognosis in pertussis depends on the age of the child, and on the presence or absence of pulmonary complications.

23. In the control of the spasmodic cough, antipyrin fortified by bromides has given the best results. We have not obtained favorable effects from injections of ether, or from vaccination.

24. Pertussis vaccine has a specific effect in about one-fourth of the cases. In those which fail to respond to treatment, the vaccine may be given too late or they may not be due to the Bordet bacillus.

R. N. ANDREWS.

PRELIMINARY REPORT ON THE TREATMENT OF PERTUSSIS BY THE X-RAY—Henry I. Bowditch and Ralph D. Leonard (Boston Med. & Surg. Jour., March 8, 1923): Twenty-six cases of active pertussis received X-ray treatment. The patients were from three months to forty years of age and were ill from one to ten weeks. Each patient received three or four x-ray treatments, at intervals of two to three days; the dosage was regulated according to the age of the patient, and the total amount of the X-ray given any one patient was well under an erythema dose. About ten per cent were prompt cures, spasms and cough disappearing entirely after two or three treatments; in a period of six days seventy per cent showed a very definite improvement, the number of paroxysms being much diminished to one or two a day, during a period of seven to ten days.

Ten to fifteen per cent showed no apparent benefit. The treatment at present is wholly empirical but the authors believe it may prove to be of more value than any other form of treatment.

THOS. MEYERS.

USE OF X-RAY IN TREATMENT OF PERTUSSIS—H. I. Bowditch (Boston Med. and Surg. Jour., Sept. 6, 1923): Three hundred and fifty cases were treated with the x-ray, the first three exposures at two-day intervals; if more were needed, they were given at intervals of a week, following the first three. Exposures were made alternately on the anterior and posterior aspects of the chest,

with clothes on, with the tube 26 inches away. Filter A was used, with 12 to 16 milliamperes from three to four minutes. Shorter treatments were given for children under eight months.

The results in the majority of cases were: eight hours after exposure the cough became softer and less frequent, vomiting and convulsions stopped, and the children slept. Sixteen hours later the cough became more characteristic, but vomiting and convulsions did not reappear. Subsequent treatment had similar effect.

One or two months after treatment the mothers reported 75 to 100 per cent improvement. Some found no relief; there was no absolute cure.

The treatment should be used in conjunction with vaccine.
THOMAS MEYERS.

THE TREATMENT OF WHOOPING COUGH IN PRIVATE PRACTICE—Wm. C. McKibben (Boston Med. & Surg. Jour., Sept. 6, 1923): Records were kept of all phases of treatment as applied in an extensive epidemic beginning in 1919. Response to treatment was better among the more well-to-do patients, where segregation and re-infection were much less, and intelligent co-operation could be better carried out than in the thickly populated foreign quarter.

Auricchio of Rome in January, 1923, published observations made on the blood of ten children who were given pertussis vaccine; these showed marked improvement in the opsonic index fairly early, while the complement fixation test did not show immunity developed until the third week of the treatment. This indicates why immediate improvement by vaccine does not usually result.

McKibben uses fresh plain or combined pertussis vaccine, injecting it deep intramuscularly into the buttock at intervals of two days. The initial therapeutic dose was one billion; the second dose, two billion; the third, four billion and the fourth dose five or six billion. Occasionally one or two more doses of equal size were necessary. Even eight or ten billion were given in older children with safety.

The duration of the disease and the severity of the symptoms were usually reduced, and the complications were much less frequent, following vaccine treatment. Infants seemed to respond to it better than older children.

Drug therapy gave the usual disappointing results.

THOS. MEYERS.

THE DIAGNOSIS OF ENLARGED THYMUS BY THE X-RAY AND TREATMENT BY X-RAY OR RADIUM—G. E. Peahler (Arch. of Ped.): Thymic enlargement is receiving more and more attention throughout the country. The roentgen ray is undoubtedly the most reliable means of diagnosis, and radiation by x-ray or radium is a specific in treatment. So general is the response to treatment, that if the symptoms do not show definite improvement after a few x-ray treatments or one radium treatment, the diagnosis is almost certainly incorrect, or the symptoms are influenced by some associated pathological condition. The classical symptoms are dyspnea, cyanosis, and an inspiratory stridor. The chief complaint is nearly

always cough or attacks of choking, which come and go, appearing frequently in paroxysms. It is conceivable that the thymus might be enlarged in thickness and not in breadth. Most of these moderate grade shadows in the upper mediastinum are due to lymphadenitis rather than to enlarged thymus. Both thymic enlargement and lymphadenitis yield to x-ray treatment. Examine the child while crying, because it is while the child cries or struggles that the thymic symptoms develop. Use a 9-inch spark-gap, 5 ma. at a focal skin distance of 30 cm., for 15 or 20 minutes, with rays filtered through six millimeters of aluminum. One may use a 9-inch gap, 5 ma. 3 mm. aluminum filter, 10-inch distance, with 3 minutes' exposure for the new-born and 5 minutes for older children. Treat the patients once in four weeks; three to five treatments should be sufficient. Heublein uses the radium in capsule with 0.5 mm. silver for filter, wrapped in gauze so that when strapped to the chest by a strip of adhesive, it will be a half-inch from the skin surface. Four marks are made in the form of a rectangle over the thymic area and the nurse is instructed to allow the package of radium to remain 2 hours over each area. This makes a total exposure of 800 milligram hours.

R. N. ANDREWS.

RESULTS OF ACTIVE IMMUNIZATION WITH NEW MIXTURE (1/10 L PLUS OF TOXIN-ANTITOXIN) TOXIN-ANTITOXIN IN PUBLIC SCHOOLS—A. Zingher (New York State Jour. of Med., Feb. 1, 1924): Zingher finds that the administration of 1/10 L plus mixture of diphtheria toxin-antitoxin produces an active immunity in a large percentage of children. The conclusions are that the 1/10 L plus toxin-antitoxin mixture is the best type of mixture to use for active immunization against diphtheria. The local and constitutional reactions with this new type of mixture are very slight and compare favorably with those noted for the older type of toxin-antitoxin mixtures containing 3-5 L plus doses per cubic centimeter. The 1/10 L plus diphtheria toxin-antitoxin may be administered to infants and older children without fear of any marked local disturbance. Three doses of 1 c.c. each are given intramuscularly at intervals of from seven to ten days. The immunization following the administration of this 1/10 L plus diphtheria toxin-antitoxin is not established until three to six months after its administration.

C. A. STEWART.

THE RECTAL ADMINISTRATION OF NEOSALVARSAN IN CHILDREN—F. Fortunata (Arch. of Ped., Dec., 1923): It is necessary to know the technique used by Modigliani for the successful injection of salvarsan in the rectum: 1. With a soft catheter he washes the rectum until the water returns clean. 2. Ten minutes before the injection of neosalvarsan, he introduces into the rectum 10 c.c. of water with 30 drops of cocaine (1 per cent), and two drops of tincture of opium to anesthetize the rectal tract which must retain the solution of neosalvarsan. After the injection of cocaine, the catheter remains in place and the outer end is closed with forceps for ten minutes; after which, the forceps are opened, and the excess cocaine is let

out. 3. Through the same catheter, 10 c.c. of double distilled water and gm. 0.15 neosalvarsan with 2 drops of tincture of opium are injected into the rectum very slowly during the child's nursing. The nursing is to prevent the infant from crying. The author found the use of cocaine unsatisfactory in these cases, but concluded it was better to stop all nursing for eight or ten hours previous to the injection, giving the child, however, small quantities of light cereal-water every two hours. The treatment with arsenobenzol is very efficacious in hereditary or acquired syphilis in children. Compared with the mercurial treatment it hastens the disappearance of the syphilitic manifestations. The administration of the arsenobenzol by rectum in infancy has the advantage over the intravenous treatment in that it is readily applicable and more practical. In order to be effective, it is necessary to administer a cycle of rectal injections, varying from five to seven days. The medicine should be injected in increasing doses as follows: minimum 10-15 c. gm. per dose; maximum 60 c. gm. in children under one year. It is necessary to proportion the dose to the weight of the body.

R. N. ANDREWS.

THE SPACE-COMPENSATING FUNCTION OF THE CEREBRO-SPINAL FLUID—ITS CONNECTION WITH CEREBRAL LESIONS IN EPILEPSY: Walter E. Dandy. (Johns Hopkins Hospital Bulletin, August, 1923.) In a series of operations for the relief of epilepsy, a number of changes were found with considerable uniformity. These were: (1) dilatation of ventricles, (2) collection of fluid on the surface of the brain, (3) pockets of fluid in the brain substance, (4) softening of the brain in association with these collections of fluid, (5) areas of induration in the brain, (6) changes in the meninges, and (7) congenital malformation. It is believed that these are evidences of actual cerebral lesions (end-products of repair), and the frequency of the findings leads to the conclusion that there is a pathological basis for so-called idiopathic epilepsy in a large proportion of cases. Confirmation of this view is obtained by means of ventriculography, which in a certain proportion of cases shows acquired or congenital distortion of the ventricles. A more detailed study of the lesions will be made at some future time.

C. A. STEWART.

OBSERVATION ON THE TREATMENT OF SCARLET FEVER WITH SCARLATINAL ANTISTREPTOCOCCIC SERUM—Francis G. Blake, James D. Trask and John F. Lynch (Jour. of the A. M. A., March 1, 1924): These investigators find that the anti-scarlatinal serum prepared by Dochez by the immunization of a horse with the scarlet fever streptococcus possesses the capacity to blanch completely and permanently the exanthem in a local area about the site of intracutaneous injection in patients having scarlet fever. This property is apparently specific for this serum and therefore is undoubtedly of diagnostic value. In addition the serum apparently possesses very marked curative properties. In twelve early cases of scarlet fever, five of which were severely toxic, administration of the serum was followed by rapid and complete recovery in

twelve to thirty-six hours. In the majority of cases a single intramuscular injection of forty to sixty c.c. of serum was given. In two very toxic cases approximately two hundred c.c. was required.

C. A. STEWART.

THE USE OF SALICYLATES PER RECTUM—George R. Irving (Arch. of Ped., Dec., 1923): The method of giving salicylates per rectum, while not a new one, was taken up in an attempt to find a more generally satisfactory way of administering this drug. At one time it was thought that it would be a fair way of prescribing the amount to be used to allow one grain per body pound weight, but he has since used in certain instances, and with safety, a grainage almost three times the body weight of certain of our patients, so that at the present it is impossible to state a rule as to dosage. The average dose has ranged from 20 to 100 grains. The author advises the use of a "baby bulb syringe," sometimes called the ear syringe, for use in administering an enema to an infant. Use plenty of vaseline about the anus and on the syringe tip in order that as little irritation as possible will be experienced in slowly introducing the inch and a half of nozzle. It is a standing rule that the rectal administration be attempted only after one hour has elapsed from the time of the movement of the bowels. He has taken the stand that the injection be held in at least one hour for its absorption, so that if expulsion has taken place within this time, he urges that the process be repeated. Salicylate in the form of sodium salicylate may be conveniently administered per rectum. Administration may be considered safe in the hands of an attendant with ordinary intelligence or without special training. Relatively large doses may be given once or twice daily. By this method of administration the stomach is particularly free of irritation.

R. N. ANDREWS.

ROENTGENOLOGY

SUPERVISORS:

LEO G. RIGLER,

MPLS. GEN'L HOSPITAL, MINNEAPOLIS

A. U. DESJARDINS,

MAYO CLINIC, ROCHESTER

THE CUMULATIVE EFFECT OR SUMMATION OF X-RAY EXPOSURES GIVEN AT VARIOUS INTERVALS: Warren and Whipple. (Jour. Exp. Medicine, Dec., 1923.) In previous papers these authors have detailed their experimental methods, which consist of giving large doses of x-rays over the abdomen of dogs, producing a marked lesion in the intestines and stomach. The average maximum sublethal dose for dogs was divided into a number of fractions which were administered at different intervals. By varying the interval and the dosage they were able to determine the following facts:

1. One large dose causes a definite injury to the mucosa of the small intestine and the severity of the clinical intoxi-

cation parallels the extent of the injury. The intoxication lasts 4 to 6 days if the dose is sublethal.

2. Small, repeated doses within the 5 or 6 day period will cause practically the same cell injury and clinical intoxication as a single dose equal in size to the sum of the small doses. Doses given at an interval of more than 6 days do not show this summation but, in fact, in one experiment seemed to show some increased tolerance.

3. These results are markedly different from the cumulative effect upon the skin especially as expressed by Kingery's formula. In view of the fact that the intestine in its position is comparable to deep-seated tumors, it would seem reasonable to use the evidence adduced from these experiments as an index to the effect of x-ray dosage upon tumors, rather than to use the effect upon the skin.

LEO G. RIGLER.

ANATOMO-RADIOLOGICAL STUDY OF THE MEDIAN CARDIO-VASCULAR SHADOW AS SEEN FROM THE FRONT—L. Delhern and Robert Chaperon (Jour. de Radiologie et d'Electrologie, January, 1923): Until recently most of the classical descriptions of the radiologic appearances of the mediastinal cardio-vascular shadow have led us to believe that the right side of this shadow is produced from above downward by the ascending aorta, the superior vena cava and the right auricle; the majority of radiologists believing that the aortic shadow projects to the right beyond that of the vena cava. The left side of this cardio-vascular shadow was thought to be made up, from above downward, of the arch of the aorta, the pulmonary artery, and the left ventricle of the heart. By some the aortic hemicircle was considered to represent the descending portion of the arch and by others the first portion of the descending aorta.

The object of the authors of this valuable contribution was to attempt to dissociate the various elements in the composite shadow representing the cardio-vascular mass as seen from the front. They first made radiographic studies of the thorax of each cadaver *in statu quo* and then proceeded to render opaque the more important structures entering into the formation of the mediastinal cardio-vascular shadow. It was essential to avoid altering the relations of the mediastinal contents, and they therefore accomplished their object by injecting baryta milk through the inferior vena cava from below the diaphragm without disturbing the thorax in any way. The study was repeated on 14 subjects of different ages, and more than 175 radiographies were made.

The more important results are as follows: with respect to the formation of the right border of the median shadow, comparison of the radiographies made before and after opacification disclosed the fact that the upper part of the shadow is produced by the superior vena cava and the right brachio-cephalic venous trunk. Point D represents the termination of the right border of the superior vena cava at the right auricle. Point D¹ corresponds to the outer edge of the orifice of the inferior vena cava in the right auricle. According to the descriptions of anatomists the ascending aorta lies in the median line almost entirely hidden behind the sternum. From a study of the injected aorta in eight subjects it appears that the normal ascend-

ing aorta does not project to the right perceptibly beyond the right border of the sternal serrations or beyond the right margin of the spinal column, and in three subjects the right border of the ascending aorta did not pass to the right beyond the median line; therefore the ascending aorta does not form the right border of the cardio-vascular shadow, which is, in fact, produced from above downward by the right brachio-cephalic venous trunk, the superior vena cava and the right auricle; the aorta always lying well within the vena cava. The experiment was repeated on young subjects as well as on very old subjects in order to determine if the senile aorta can overshadow the vena cava and appear to the right of it, but, under normal conditions, even the senile aorta never projects beyond the right border of the superior vena cava, and, therefore, plays no part in the formation of this side of the cardio-vascular shadow.

With reference to the left border of the mediastinal shadow there has been considerable divergence of opinion even among anatomists, particularly about the aortic arch. Some claim there is no such thing as a descending portion of the arch and call it the first portion of the descending or thoracic aorta. According to Delherm and Chaperon the aortic hemicircular shadow is caused by the terminal portion of the arch. Above the hemicircle the upper limit of the left border of the median shadow is due to the sterno-vertebral shadow, but may exceptionally be produced by the projection of the subclavian artery in the first left interspace.

According to them the middle arc of the median shadow on the left side represents, under normal conditions, the profile of the pulmonary artery. However, in two cases in which the heart was large and transverse, the middle arc projected beyond the pulmonary artery and they feel obliged to conclude that the left margin of the pathologic auricle may take part in the formation of this border. To settle this point they injected primarily the aorta (always from below and without opening the thorax) and the left side of the heart; and secondarily the right side. They were thus able to convince themselves that the pulmonary artery projects considerably beyond the descending aorta and that it constitutes by itself the middle arc of the shadow on the left side. However, this experiment was carried out but once and they feel that it will require confirmation by clinical means. The upper border of the median shadow

is produced by the left brachio-cephalic venous trunk which joins the aortic hemicircular shadow below. They found it uniformly impossible to render the auricles sufficiently opaque to allow of accurate study.

A. U. DESJARDINS.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

SEXUAL PROBLEMS OF TODAY. William J. Robinson, M.D. 12th edition. 340 pages. New York: The Critic and Guide Company, 1923. Cloth, \$2.00.

HIGH FREQUENCY ELECTRIC CURRENTS IN MEDICINE AND DENTISTRY. S. H. Mouell, M.D. 465 pages. Illustrated. New York: William R. Jenkins Co., 1923. Cloth, \$4.00.

PRACTICAL ELECTROTHERAPEUTICS AND DIATHERMY. G. Betton Massey, M.D., Fellow and Former President American Electrotherapeutic Association; Member Philadelphia Obstetrical Society, etc. 402 pages. Illustrated. New York: MacMillan Company, 1924.

DISEASES OF THE SKIN: Frank Crozer Knowles, M.D., Professor of Dermatology, Jefferson Medical College, etc. 2nd edition, thoroughly revised. Lea and Febiger, Philadelphia and New York, 1923.

The number of text-books on Dermatology by American authors at the present time, compared to those of twenty years ago, has grown considerably.

Among those appearing in later years, that of Knowles stands out as a very useful and, for its size, a very comprehensive work.

While there has been considerable advance in knowledge in recent years in respect to diseases of the skin, there is unfortunately much still obscure both as to etiology and treatment. The reader, however, of this book will find the latest information on the subject concisely and clearly stated.

The work is well illustrated and the number of illustrations we have in this issue which are not in the previous one certainly adds to its attractiveness. The reviewer feels that the book may be recommended to all who wish a concise, practical and sound work in dermatology.

J. M. ARMSTRONG.

Mrs. Christine Lund of Hutchinson, Minnesota, offers for sale complete office equipment of the late Dr. Theo. C. Lund, physician and surgeon. Surgical instruments, scales, safe, desk (McCaskey's system), sterilizer, etc. Equipment in good condition. For information inquire of Citizens Bank, Hutchinson, Minn.

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BY EXAMINATION

| <i>Name</i> | <i>School and Date of Graduation</i> | <i>Address</i> |
|-------------------------------|---|---------------------------------------|
| Anderson, Karl Walter..... | U. of Minn., M. B., 1923..... | 2508 11th Ave. So., Minneapolis. |
| Andrews, Robert S..... | Johns Hopkins, M. D., 1923..... | Swedish Hospital, Minneapolis. |
| Baldwin, Archie Edward..... | U. of Minn., M. B., 1923..... | Brownsdale, Minn. |
| Bergman, Oscar Bernard..... | U. of Minn., M. B., 1923..... | 329 Union St. S. E., Minneapolis. |
| Bianco, Anthony Joseph..... | U. of Minn., M. B., 1923..... | St. Mary's Hospital, Duluth. |
| Bliss, John Herbert..... | Columbia U., M. D., 1921..... | Rochester, Minn. |
| Cabot, Geo. Sheryl..... | U. of Minn., M. B., 1923..... | General Hospital, Minneapolis. |
| Carleton, Rachel..... | U. of Minn., M. B., 1923..... | Research Hospital, Kansas City, Mo. |
| Creighton, Ralph Higby..... | U. of Minn., M. B., 1923..... | General Hospital, Minneapolis. |
| Dobson, Herbert Victor..... | Toronto, M. B., 1919..... | Rochester, Minn. |
| Eder, Lawrence Frank..... | U. of Minn., M. B., 1923..... | 2617 3rd Ave. So., Minneapolis. |
| Eitel, Geo. David..... | U. of Minn., M. B., 1923..... | General Hospital, Minneapolis. |
| Fredrickson, Clyde Harald.... | U. of Minn., M. B., 1923..... | General Hospital, Minneapolis. |
| Garbrecht, Arthur..... | Konigl-Friedr-Wilh. U., Berlin, Germany, 1922..... | Lowry Bldg., St. Paul. |
| Gray, Royal Clendenning.... | U. of Minn., M. B., 1923..... | 1717 1st Ave. So., Minneapolis. |
| Greisheimer, Esther Maud.... | U. of Minn., M. B., 1923..... | 507 Essex St. S. E., Minneapolis. |
| Haddow, Norval Wm..... | U. of Minn., M. D., 1923..... | Chippewa Falls, Wis. |
| Hall, Horace J..... | U. of Minn., M. D., 1923..... | N. P. Hospital, St. Paul. |
| Hebeisen, Milton Boyce..... | U. of Ill., M. D., 1922..... | Carver, Minn. |
| Hefke, Hans Wilhelm..... | U. of Hamburg, Germany, 1923. | St. James, Minn. |
| Hermanson, Peter Eugene.... | U. of Minn., M. B., 1923..... | Ancker Hospital, St. Paul. |
| Hurd, Fritz Draper..... | U. of Minn., M. B., 1923..... | University Hospital, Minneapolis. |
| Johnson, Ray Geo..... | U. of Minn., M. B., 1923..... | Mds. Park Sanitarium, St. Paul, Minn. |
| Jones, Louis Edwin..... | U. of Minn., M. B., 1923..... | St. Barnabas Hospital, Minneapolis. |
| MacRae, Gordon Campbell.... | U. of Minn., M. B., 1923..... | 3041 Holmes Ave., Minneapolis. |
| Mailer, Robert..... | U. of Edinburgh, M. D., 1923.... | Rochester, Minn. |
| Moore, Thomas Benjamin.... | U. of Minn., M. B., 1923..... | General Hospital, Minneapolis. |
| Reynolds, Gardner Shaw..... | U. of Minn., M. B., 1923..... | 2145 Knapp St., St. Paul. |
| Richards, Wm. Bryant..... | U. of Minn., M. B., 1923..... | Duluth, Minn. |
| Setzer, Hobert Joseph..... | U. of Minn., M. B., 1923..... | 403 Dewey Ave., St. Paul. |
| Sherwood, Noble Pierce..... | U. of Minn., M. B., 1923..... | 1801 Indiana St., Lawrence, Kansas. |
| Simons, Edwin J..... | U. of Minn., M. B., 1923..... | University Hospital, Minneapolis. |
| Urner, John Arnold..... | U. of Minn., M. B., 1923..... | 3716 Elliot Ave., Minneapolis. |
| Van Valkenburg, Fredk. W.... | U. of Minn., M. B., 1923..... | Long Prairie, Minn. |
| Welch, Elwyn H..... | U. of Minn., M. B., 1923..... | 1536 La Salle Ave., Minneapolis. |

THROUGH RECIPROCITY

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|-------------------------------|-----------------------------------|-----------------------------------|
| Austen, Willard Emerson.... | U. of Pittsburgh, M. D., 1921.... | Rochester, Minn. |
| Backus, Andrew Stephen.... | Toronto, M. D., 1905..... | 1954 University Ave., St. Paul. |
| Kilgore, Franklin Hartman.... | U. of Tex., M. D., 1921..... | Rochester, Minn. |
| Lazar, Henry L..... | Tulane, M. D., 1905..... | 310 Donaldson Bldg., Minneapolis. |
| Luse, Horatio Devol..... | Hah. Chicago, M. D., 1911..... | 1214 West 32nd St., Minneapolis. |
| McElroy, Jesse L..... | Ind. Med. Coll., M. D., 1907.... | Ancker Hospital, St. Paul. |
| Robertson, Paul Augustus.... | Med. Coll., Va., M. D., 1921.... | Austin, Minn. |
| Veirs, Dean M..... | U. of Louisville, M. D., 1921.... | 222 Otis, St. Paul. |

NATIONAL BOARD CREDENTIALS

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|---------------------------|--------------------------------|---------------|
| Pederson, Oluf Johan..... | Northwestern, M. D., 1915..... | Hanska, Minn. |
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